EdD Dissertation

Learning out of the box:

Perceptions and use of a VLE at an HE institution

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Abstract

Virtual learning environments are playing an increasingly significant role in higher education. This study explored use of a VLE (Blackboard) in an institution and the perceptions of staff using it. Usage statistics were combined with qualitative interview data investigating these perceptions within their socio-cultural context.

VLEs are promoted as enabling active collaboration and knowledge construction. Yet in common with other studies a more content-driven approach was observed. Blackboard's utility as a content repository was evident, as was academics' willingness to experiment further. Staff were, however, constrained by social factors including minimal legitimation of their involvement with online learning (largely due to the pervasive research agenda) and a perceived lack of institutional strategic planning for effective online learning.

An interesting dichotomy was observed between two views on the best way to develop an online learning environment. On the one hand Blackboard seems to be a 'ready-out-of-the-box' commercial system, but has constraints on integration and tailoring to local needs. On the other, a bespoke system could take longer to realise, but be fully integrated and more sustainable. This sort of dialogue, and the use of a commercial VLE as a kind of "nursery slope" experience, enables institutions to plan a more effective online learning environment.

Such plans, and future research, need to describe not only the successful provision of integrated "e-tools" but also the strategic and cultural dimensions of implementation. They need to support not only currently popular tools, but to seek to understand how various tools might be most effective within a given socio-cultural context.

Higher education institutions need to be fully aware of the constraints and aspirations within their organisation's subcultures, as well as the capabilities of new media, in order to make an informed choice about how to create effective online learning environments.

(294 words)

Dedication

To Robert, Helena and Rosemary

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Declaration

I declare that the work in this dissertation was carried out in accordance with the Regulations of the University of Bristol. The work is original except where indicated by special reference in the text, and no part of the dissertation has been submitted for any other academic award.

Any views expressed in the dissertation are those of the author and in no way represent those of the University of Bristol.

The dissertation has not been presented to any other University for examination either in the United Kingdom or overseas.

Signed Stephen Greenwood

Date: 28th June 2005

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Chapter 1: Introduction

1.1 Overview

Most higher education institutions are now implementing Web-based systems to support learning and teaching. There are many drivers of this process, including diversification of learner populations, student demand and the need to meet increased teaching and administrative burdens within limited resources. But how are these new tools actually perceived, used, and developed?

The University of Bristol has implemented a commercial virtual learning environment (VLE), "Blackboard"[2], on the recommendation of its own support services and other internal groups (University of Bristol, 2000). The system has been used by staff and students since 2001. At the same time, the institution has been investing in the development of an institutional "portal" Web site intended to provide an integrated view onto staff and student information relevant to teaching and research.

These two initiatives echo a wider trend towards the 'virtual university' (Brown & Duguid, 1995), in which institutions are increasingly providing online resources for students and staff and conducting more business via the Internet. Such changes have the potential to support and enhance the learning experience and mitigate the reduction in staff-student contact resulting from rising student numbers (Ryan et al., 2000; Patel et al., 2000).

It is important that VLE systems are not only fit for purpose and provide the right tools and resources but are also being used effectively and efficiently. This will depend as much on the knowledge and perceptions of staff and students using it as on the nature of the VLE itself. Online learning involves a variety of new concepts and skills which cannot be assumed to transfer from other teaching environments. Indeed, perhaps as a result of the failure of some early virtual university projects, there seems to be a renewed interest in online pedagogy and VLEs are now being driven as much by academics as technologists (Pittinsky & Pittinsky, 2002).

This study therefore sets out to investigate the use made of the Blackboard VLE and perceptions of staff using it. What did staff believe the VLE could do for them and was this successful?

1.2 Significance of the study

The World Wide Web is increasingly being used to support learning, teaching, assessment and administration. 'Virtual Learning Environments' (VLEs) – whole-course Web sites with multiple features to support teaching and learning – are now becoming commonplace. On the national arena, most Higher Education (HE) institutions now have a VLE (JISC & UCISA, 2003 found that 84% of pre-1991 and 97% of post-1991 universities have one). Government initiatives[3] are also driving the use of the Web in education expected by today's students. With increased competition between institutions, looking for efficiency savings in teaching and administration are now mission critical activities.

Higher Education Institutions (HEIs) in the 21st Century rely on various forms of electronic delivery and communication to survive in a marketplace requiring education to be flexible, up to date, cost-effective and time-efficient. Whilst 'traditional' teaching formats may remain for students on campus, increasing numbers of students will be part time, computer literate, fee paying and demanding. Wider participation in HE from a broader cross-section of society is also driving institutions away from 'one-size-fits all' mentalities. School-leavers are likely to expect a higher and higher dependence on digital technologies with which they have grown up.

The recent emphasis on "e-learning"[4] is part of the sector's answer to these issues, and VLEs are an important aspect of this answer. They draw together much of the functionality required for e-learning.

For all these reasons VLEs are attracting a great deal of interest across Higher Education, but the educational issues they raise have only just begun to be investigated. Evaluations of VLEs have tended to focus on technical features more than on education and usability[5]. Coherent evaluative frameworks have been proposed to assess these aspects (Benigno & Trentiin, 2000; Britain.S. & Liber, 2001). Research in the area has, however, been somewhat limited in scope. VLEs will need to be able to cope with a wide range of learning styles, educational functions and organisational issues (Anderson & Jackson, 2000).

Numerous methods for creating VLEs now exist, but how are we to know what the appropriate uses of VLEs are going to be? Any system, bespoke or commercial,

requires significant outlay of resources for development/purchasing of the system, training and documentation. What are the important educational and human issues? Staff (and students) will have their own, perhaps differing, views on what a VLE should be, which will in turn impact its effectiveness.

It has been estimated (Ingraham & Watson, 2000) that an HE institution would need to find 10 person-years for development and implementation of a VLE, 10 person-years for roll-out and staff development plus 1 person per annum for ongoing support These are non-trivial resource implications (and probably an underestimate). Questions become focused not on "what can be done?" but "is it appropriate?" and "how will it enhance activity and work with our existing structures?"

The extent to which a VLE is integrated with other systems is an increasingly important issue. A distinction can be made here between a VLE and a more integrated managed learning environment (MLE, see 2.3). A recent survey of 25 HE and FE institutions (JISC & UCISA, 2003) found that the top three advantages of implementing such MLEs were thought to be:

- open & wider access to learning
- greater efficiency in administration
- integration of data across the institution

The extent to which this is possible with commercial (and hence relatively generic) software has been questioned in the community for some time (Boys, 2002; JISC, 2002; Browning, 2003). Blackboard now has the largest share of the UK higher education market at 43.2% (Browne & Jenkins, 2003) and is ostensibly interoperable using additional commercial modules (Blackboard "Building Blocks"). Despite this, 77% of higher education institutions (HEIs) are developing and/or integrating MLE systems using only in-house capability (JISC & UCISA, 2003). In response to a requirement for information to be held primarily in electronic form (Browning, 1999), the University of Bristol is developing its own institutional 'Portal' (Appendix 10) as an integrated online information point, to also include at some stage a "teaching portal". How might this relate to the use of a commercial VLE?

It is interesting to note that 30% of pre-1991 universities expect to move ***backwards*** in terms of systems integration in 3-5 years time and 50% expect no change (JISC & UCISA, 2003). Around 38% of HEIs have an institutional portal (JISC & UCISA,

2003). This suggests a lack of confidence in the possibilities for developing truly seamless integrated learning environments with commercial products.

The study is therefore significant in informing debate on appropriate uses and effective implementation of VLEs. It may help institutions avoid misspending of scarce resources in this still-emerging area.

1.3 Purpose of the study

Many educators wish to avail themselves of the advantages of the Internet to support their teaching activities, but creating high quality, educationally sound electronic resources can take up considerable time and expertise. Virtual Learning Environments (VLEs) are software systems with much of the necessary infrastructure needed to do this already built in and so may seem to alleviate some of this cost. They provide an integrated set of Internet tools for authors and users, enable easy upload of materials and offer navigational tools and a consistent 'look and feel'.

In 2001 the University of Bristol began a pilot of two parallel approaches to providing VLE facilities (one commercial and "off-the-shelf", one developed in-house). This pilot[6] aimed to investigate mainly technical and usability issues, summarised in an internal report (Browning, 2002). The current study was initiated, however, because the author decided it was equally important to determine whether these facilities meet the educational needs of academic staff and students.

The broad purpose of the project was therefore to investigate the educational uses of VLEs. Since Blackboard had been chosen and installed as the institutional VLE, this became the focus of the research. The main investigative strands were:

a) how staff perceive VLEs by asking them about their use of Blackboard
b) use of the Blackboard VLE by analysing usage data from the system

Using focus groups, interviews, user statistics and other methodologies, the study focused on the experience of staff creating and maintaining online courses alongside a detailed analysis of usage statistics in order to investigate these strands.

1.4 Research Questions

Given this background, the research questions have been designed to investigate the use and staff perceptions of a VLE in an HE setting. The first three questions relate to strand a) above, the fourth to strand b) and the final one is a general question that should draw on both strands.

1 In what ways do staff expect that VLEs will support learning, teaching and assessment?

2 How do these expectations relate to explicit/implicit views of the learning and teaching process?

3 In what ways are the above expectations congruent/incongruent with the capabilities of the VLE being implemented?

4 How is the VLE being used by staff?

5 What recommendations can be made for further development of VLEs?

Chapter 2: Context of the study

2.1 The evolution of the World Wide Web

The World Wide Web (the Web) is the now familiar graphical interface to the Internet[7]. The history of the latter is longer, but the Web has been the vehicle that has enabled the Internet to become part of the infrastructure of everyday life and of educational institutions. Ever since its first major growth spurt in the early 1990's, the higher education (HE) community has increasingly used the Web for displaying and retrieving information. The ability to use graphical interfaces mixing text and images was important in this expansion. Before this time, the Internet had to be used though text-only interfaces requiring significant know-how and persistence.

As the Web has 'matured' and become more user-friendly, the need for *technical* training and guidance has decreased as ease of use and acceptability have increased. Teachers in HE started to make use of the Web for teaching in the 1990's, pointing students towards relevant sites. Some who had the skills and time began to create their own Web sites for students, linking resources together.

As the size of the Web and the amount of information on it grew exponentially[8], information retrieval and management skills – itself a growing research area (Hsieh-Yee, 2001) – became imperative:

> "...the total amount of information stored on the Internet is about 500 times greater than what is accessible using search engines" (Colley & McDonnell, 2001).

The 'superabundance' of information on the Web was noted by Lankshear et al. (2002) as a mountain of information that is, in contrast to most other information media, initially unfiltered and presented in idiosyncratic ways by authors. The appearance of Web 'portals' or 'gateways' has been important in enabling efficient retrieval of high quality information from this "mountain". The HE community have been particularly active in this area. The Resource Discovery Network[9] is one such portal, offering discipline specific resources[10] and additional support such as the 'Virtual Training Suite' across many disciplines.

For information providers, tools[11] for publishing on the Web have become easier for the non-technical user to utilise, although they are still not as much part of the infrastructure, or as well used in universities, as other software such as word-processing packages. Publishing direct to the Web is also becoming easier through recent technological developments such as "Weblogs" or "blogs" – online interactive personal journals with hyperlinks to other blogs and documents (Godwin-Jones, 2003) [12].

In parallel, the Web technologies have become increasingly sophisticated, enhancing the publishing and searching of data though developments such as XML, RDF, and now the "Semantic Web"[13]. Most recent has been the evolution of the Web from an Information Oriented Architecture (millions of interconnected documents) to a Service Oriented Architecture (SOA, a collection of services which can communicate with each other)[14]. This makes it possible to offer individualised, customisable services to individual users or computers and lies behind many of the latest Web portals and commercial sites. An Information Oriented Architecture can be thought of as one in which each page on the Web is a discrete entity, only connected to others by the hyperlinks to other pages placed within it by the author. The links may be created manually (in the case of single Web pages) or dynamically (in the case of sites using an underlying information database). Information is exchanged, but there is no guarantee it is the right information because the two parts (information request and information delivery) have normally been designed separately for very different purposes. This makes it hard to construct systems to support learning as the quality of information is so variable. In a Service Oriented Architecture, the systems involved are required to use a common, extensible[15] framework and language which standardises the format of any information request. This is so that information requests will be interpreted identically by any computer system using the framework. It means that any two systems have the potential to be "interoperable" (work together with minimal conflict or error). This is very important in the provision of institution-wide solutions attempting to integrate information from diverse data sources (including student information systems, personnel databases, library catalogues and email services).

These and other related technologies have enabled the development of two types of Web site specifically relevant to this study:

1. Virtual/managed learning environments (see 2.3) providing a 'one-stop-shop' of online resources for students and teachers on a specific course and

2. Institutional portals providing a 'one-stop-shop' of administrative, communication and other functions for staff and students at (and often outside) an institution.

Both kinds of site use authentication to grant access to specific users, then offer them tailored content and services, but each has a different emphasis. This study is mainly concerned with the former so this will be discussed in more detail with reference to the second where relevant.

2.2 On-line learning and the virtual university

Internet technologies are rapidly evolving to provide ways for institutions to conduct more and more of their business electronically. The sophistication of the tools and cultural pressure to use them, combined with potential cost savings in administration, make the development of such systems seem hard to resist. Larger educational institutions, first in the US and Australia then Europe and elsewhere, have been purchasing or developing systems to create online versions of themselves. The term 'Virtual Universities' (Ryan et al., 2000) began to be used to describe how HEIs were shifting proportions of their provision onto the Internet, sometimes as collaborative ventures[16].

Throughout these changes, there has been a tendency to oversimplify the learning process into rhetoric such as "delivering learning" which appears at odds with the rhetoric of accepted good educational practice – learner-centred activities that promote effective learning. Indeed it has tended to be assumed that computers are generally beneficial to learning, even though there is a less than perfect understanding of how this might come about (Barnes, 2000).

University life is about much more than information transfer. It involves engagement in a rich community experience, only parts of which might transfer in some way to the virtual arena (Crook, 2002). Successful students need to exit their courses possessing not only knowledge, skills and attitudes from the cognate area but with appropriate social strategies for working in the professional world:

> "...it is a mistake to think of the university "delivering" knowledge or students as "receiving" it. Central to higher education is the way universities *provide access to communities of scholars and testimony for a student's experience among these communities.* Consequently, universities should explore resources for bringing people together, not, as some interpretations of "distance education" suggest, for reinforcing their isolation." (Brown & Duguid, 1995: para. 13, Introduction. Emphasis added)

This is just as true today as it was in the mid 1990's. Learning, on the Web or elsewhere, is an active, collaborative venture in which content plays only a part. Content-oriented provision applied to the virtual universities might even suggest a lack of attention to the quality of the learning experience:

> "...having the potential to deliver courses is not in itself sufficient. It says nothing about their quality in terms of the suitability of their content or pedagogical effectiveness." (Ryan et al., 2000:21).

If 'online learning' consists of simply making materials available electronically then this is an administrative and cost-saving benefit but it is hardly using the medium to full effect. Contemporary tools for communication (through text, image and video), graphical representation (still and video), sound transmission and interactive data exchange make the Web a potentially rich environment for new modes of educational activity.

> "Although it is true that there is no proven 'right way' to design an online learning experience, there is plenty of evidence of approaches that don't work, in both traditional and online delivery. Perhaps the most fundamental is the 'information is king' approach – Diana Laurillard has put this in context most succinctly: 'It is as absurd to try and solve the problems of education by giving people access to information as it would be to solve the housing problem by giving people access to bricks.' ... it all too often just means that [lecturers] want to reproduce the same stuff they have always done – only this time on a computer!" (Stiles, 2002:7, 8).

Laurillard's 'conversational framework' for analysing learning media (Laurillard, 1993) is based around the interactions between students' actions, students' conceptions, the teacher's conceptions and the teacher's constructed environment. It can be applied to various types of learning technology to enable consideration of how this 'conversation' can be achieved so as to enable engaging and effective learning to occur. This is an important step beyond simply providing information. The question is, to what extent are 'virtual universities' providing conversations or simply delivering information?

2.3 VLEs and MLEs

Within Web-based learning systems, two main structures can be identified: *virtual* learning environments and *managed* learning environments. A virtual learning environment (VLE) is, to use the Joint Information Services Committee (JISC) definition:

> "...the 'online' interactions of various kinds which take place between learners and tutors" (Everett, 2001)

A typical VLE might include content delivery and management, curriculum (structure, mapping), communication tools, tutor support, assessment and activity tracking. The student should have a single 'window' onto their course through a VLE. A range of commercial and free[17] software is now available for creating VLEs.

Of significant importance in recent years is the extent to which VLEs are integrated with institutional systems (student records, staff directories), and the efficiencies of scale this brings about[18]. An institution might wish to have a single conglomerate VLE incorporating various back-end systems to maximise the benefit to the front-end user portal. The term that has come to describe this is a Managed Learning Environment (MLE), defined as:

> "the whole range of information systems and processes of a college (including its VLE if it has one) that contribute directly, or indirectly, to learning and the management of that learning" (Everett, 2001)

The importance of MLEs in higher and further education has been evidenced by JISC funding "a large programme of work on the development of Integrated Environments for Learners or Managed Learning Environment" (details at http://www.jisc.ac.uk/mle/).

An MLE can be thought of as part of an institutional portal, since it has integrated access to all data and is available ubiquitously. Since the emphasis is still on teaching and learning, though, it is useful to keep the term "portal" reserved for systems with wider scope. An interpretation of the relationship between the three terms to define them for use in this study is shown at Figure 1. A portal can encompass and support teaching and learning functions of MLEs and/or have links to/from a VLE (to transmit student data for instance). The key buzzword here is "*interoperability*"[19]. Each of the different information systems (from the personnel and student databases to the production of tutorial group lists on the VLE) must accurately intermesh to ensure an efficient online learning environment.

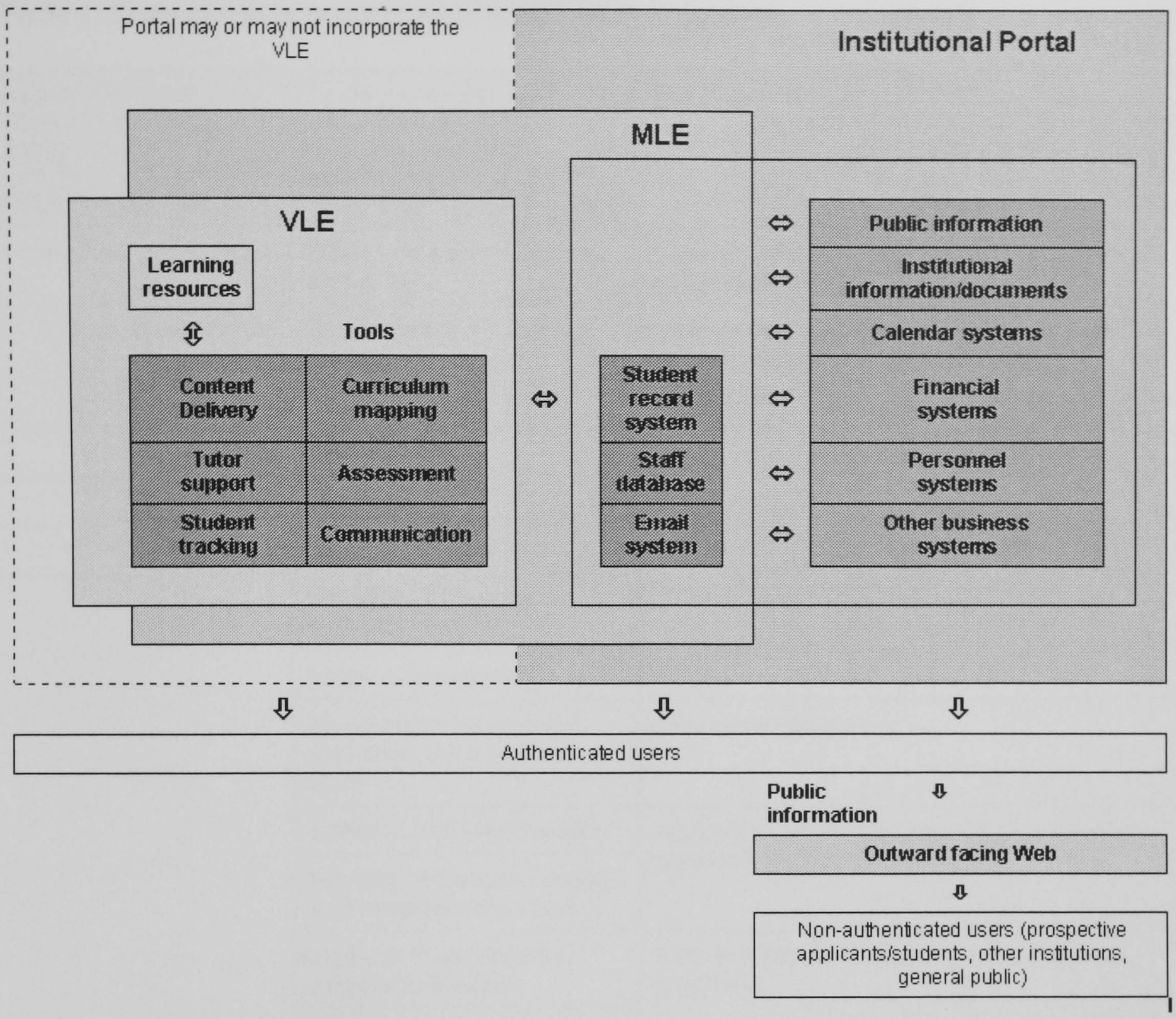

Figure 1: Inter-relationships between VLEs, MLEs and institutional Portals, based partially on a diagram from JISC (2003).

Institutions are struggling to implement effective organisation-wide computer systems (such as portals) that integrate and maximise the benefits of the various technologies. Portals must efficiently link up all the appropriate data and provide it at the right time to the right people. However, VLEs increasingly rely on the same data and technologies as institutional portals. The constantly evolving nature of Web technologies both enables and necessitates a focus on sustainability as well as innovation in terms of the content, format, infrastructure and pedagogy of Web-based learning environments (Pahl, 2003). This pressure will continue due to the "increased mobility of people, devices and computer programs, and… the evolution of the Web from an information-oriented to a service-oriented framework." (Pahl, 2003:112).

Table 1: Comparison of features required of a VLE and present in Blackboard

A local study into VLEs (Browning, 2002)	**Tools available in Blackboard**	**Requirements for a VLE (JISC, 2000)**
Generic e-tools:	***Blackboard tools:***	***A VLE requires:***
e-mail lists	ability to e-mail individuals and groups	general communications, including e-mail, group discussion and web access
"virtual filing cabinets" (i.e. somewhere to upload resources)		support of online learning, including access to learning resources, assessment and guidance
assessment or survey tools		
notice boards		
discussion boards		
calendar		
	virtual real-time chat facilities	
	student homepages	
	group areas for projects and other collaborative work	peer group support
	statistics and user tracking	tracking of student activity and achievement against these elements
	tracking of resource usage and assessment scores	
	ability to insert links to external resources	links to other systems, both in-house and externally
	links to generic online learning resources	
		mapping of the curriculum into elements (or 'chunks') that can be assessed and recorded
		online tutor support

2.4 Functionality of VLEs

A local feasibility study (Browning, 2002) discussed the use and development of "e-tools" as components within a VLE. Table 1 compares these e-tools with those available within Blackboard and the features required of a VLE according to JISC (2000). It can be seen from this that there was a fairly good match between the JISC requirements and tools available within Blackboard but that the 'local vision' of generic e-tools and perhaps Blackboard had less emphasis on tutor support, guidance and on curriculum mapping.

Four main types of activity are used within Blackboard for grouping user tracking data: content, communication, student and group. To this could be added assessments and course administration. In particular, it is useful to distinguish

between **communication**, **assessment** and **content** delivery within a VLE, each representing a significant educational function. These features need to work together to enable effective learning. Content alone without interaction may not ensure the learner can engage with, discuss and integrate new knowledge. Predetermined content could even be said to be controlling or authoritarian (Thorpe, 2002).

2.5 The Blackboard learning environment

The way systems are laid out visually is a crucial determinant of their effectiveness because of the primacy of visual clues in prompting us towards appropriate tasks (Norman & Dunaeff, 1994; Norman, 1998). Also embedded in the 'look and feel' of an interface are assumptions about the nature of learning (for instance the emphasis on acquisition of material versus participation in collaborative tasks) and cultural signposts. Blackboard is an American company so some terms used and the overall design will be influenced by this and may not translate completely to other countries.

In this section the interface will be described in relation to the main activity groupings discussed earlier. The relevant figures are on pages 24-29. There are various types of tools and activities that can be carried out on Blackboard, focussed around: **communication** (student-student and staff-student), **content** (viewing documents and materials), **assessment** (taking tests and surveys), **group** organisation (subsections for tutorial or work-groups), **student** tools (such as address book, calendar, change password) and course **administration** (for academics to set up and maintain their courses).

Each academic with responsibility for a course (a Blackboard "Instructor") is able to configure it and upload learning materials. A selection of generic tabs across the top of the screen and buttons down the left hand side are provided for navigation between and within courses respectively. The main substance of any section is contained in the remaining part of the screen.

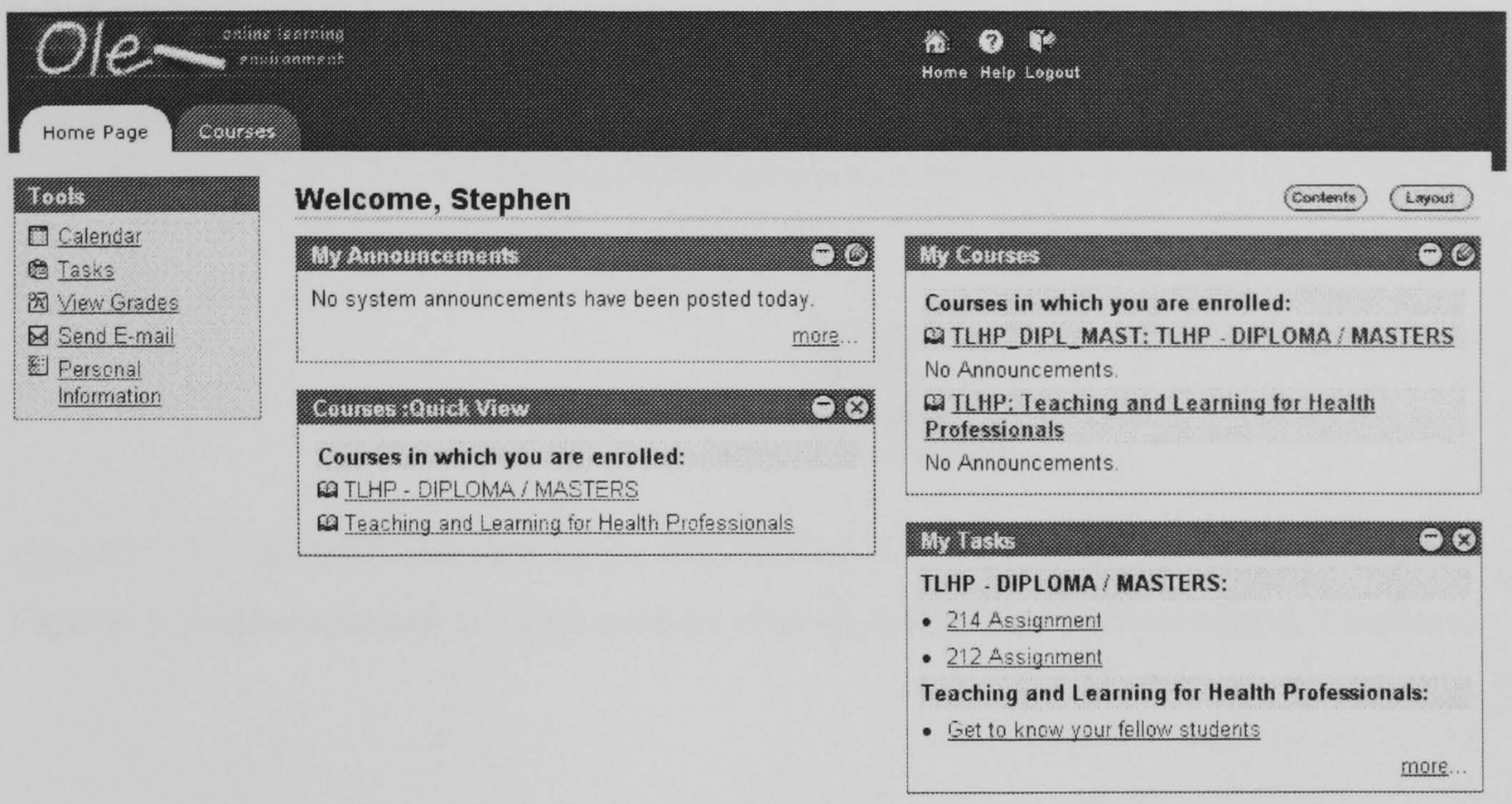

Figure 2: Blackboard welcome screen with links to courses enrolled on, announcements and tasks assigned by teachers

A main welcome page, customised for the specific user, confronts them on first logging in (**Figure 2**). This contains links to courses on which they are enrolled, to utilities such as a calendar, task lists and the change password function. The page layout is to a small degree configurable by the user but they cannot add any information, files or links here. Clicking on a course link brings the user to the main page for that course, where they will see the in-course navigation buttons down the left hand side and normally a list of announcements from lecturers (**Figure 3**). The side navigation buttons can be altered in colour and shape or replaced with text by the Instructor. The names and order of the links can be changed and a course image inserted but otherwise the appearance of any Blackboard course is standardised. The following sections deal with the features available within a Blackboard course.

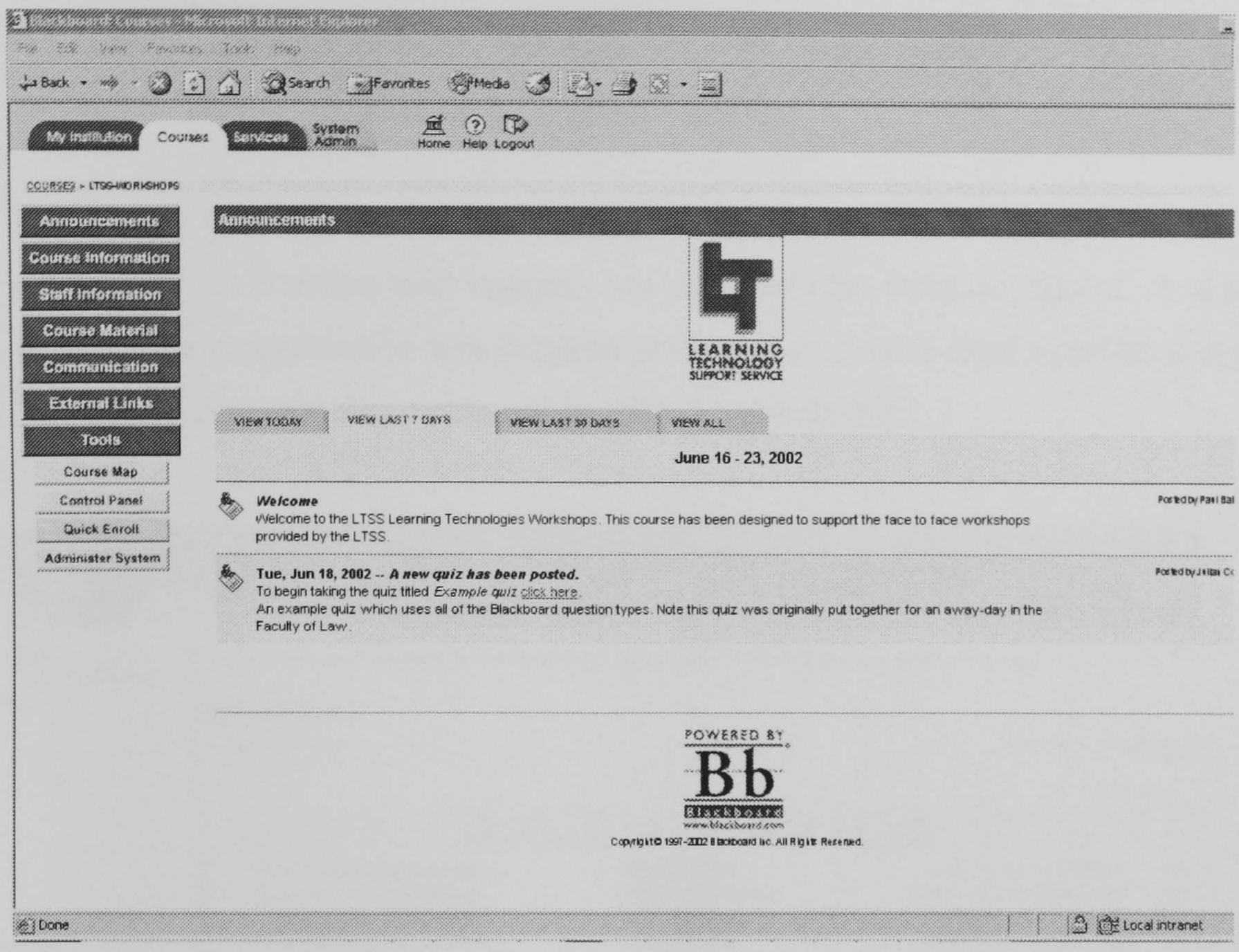

Figure 3: A Blackboard course screen showing the 'Announcements' section.

2.5.1 Communication oriented tools

The announcements page (**Figure 3**) is a form of communication tool – essentially a bulletin board providing one-way messaging from lecturer to student. Otherwise the communication tools comprise the discussion boards (**Figure 4**), group and individual email and the 'Virtual Classroom' (a real-time chat tool). The discussion boards provide asynchronous text conferencing between all those enrolled on a course. A number of boards may be set up by users with administrative rights (normally the lecturer). All users can view, post and reply to messages and there are some tools for organising and downloading messages. Message threads can be collapsed and expanded and the user can opt to view only unread messages. There is no 'alerting' tool to inform users that new messages have arrived and the only way to view messages is via a specific discussion board. If there are several discussion boards on which a user is enrolled this could lead to confusion in finding messages or act as a barrier to use. Boards can also set up within a Group area (see 2.5.4 below).

All users can be allowed to email any other users both individually and *en masse* for the whole course (although the system only recognises their institutional email address). This is done using a simple Web form.

The Virtual Classroom provides synchronous data-conferencing with text input, a whiteboard for drawing and images, but no facility for video or sound. It is launched as a separate application which takes several seconds to load even on a broadband connection but runs at a reasonable speed once loaded.

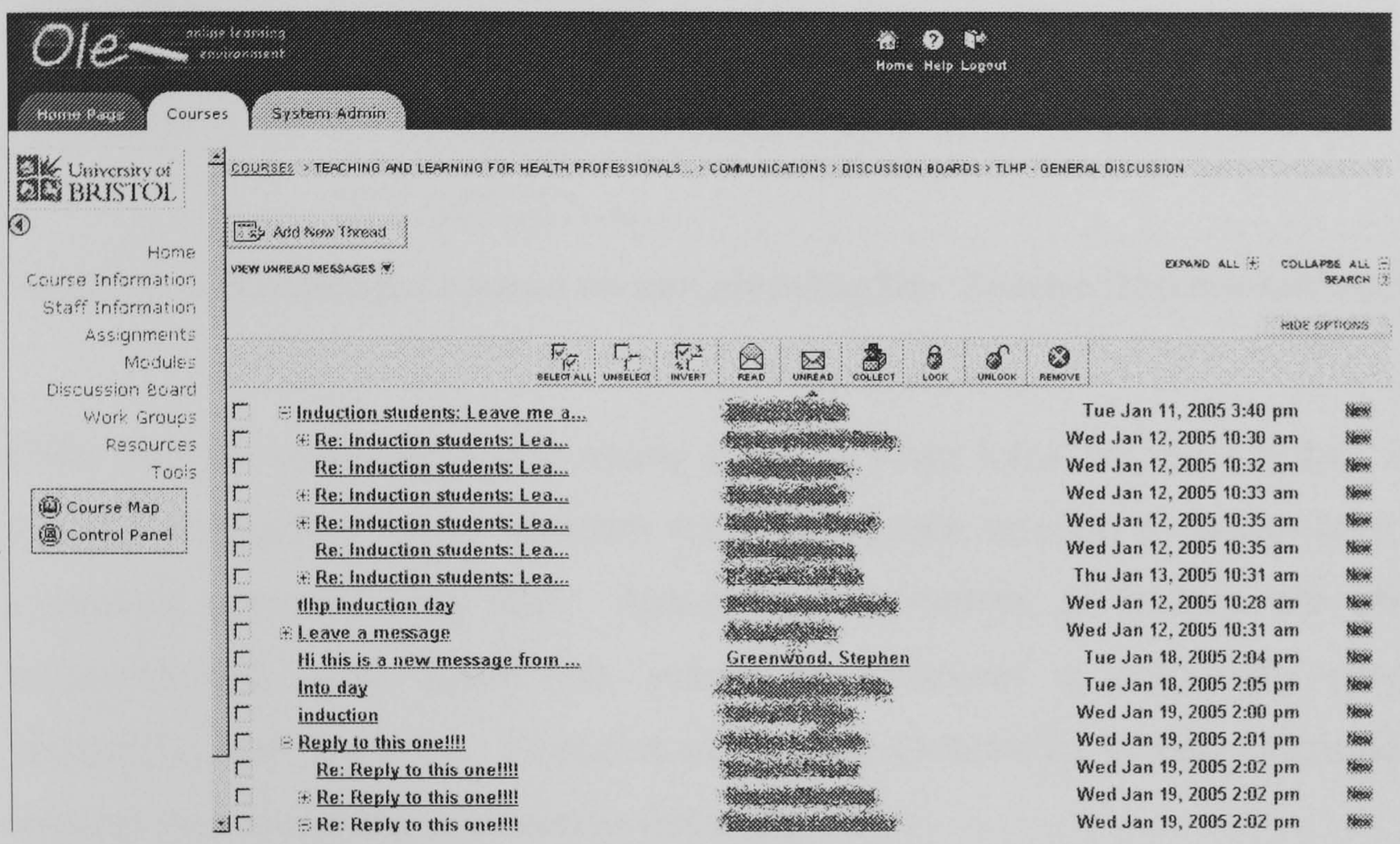

Figure 4: A Blackboard course screen showing the 'Discussion Board' (student names removed – normally listed in the central column)**.**

2.5.2 Content oriented tools

Content (course documents, presentations, handouts) can be uploaded by the lecturer into folders and subfolders they create. This content can include any format of electronic file, text or Web link (**Figure 5**). The dates that files are visible can be set and the number of views by individual students can be tracked. There is no facility for copying or moving material between folders or courses in the version used during this study. A 'Glossary' feature enabled lecturers to store terms relevant to the subject area.

There are some facilities for students to upload material. Files may be attached to a message on a discussion board or to an email. Lecturers can also allow students to upload files to a Group area (see 2.5.4).

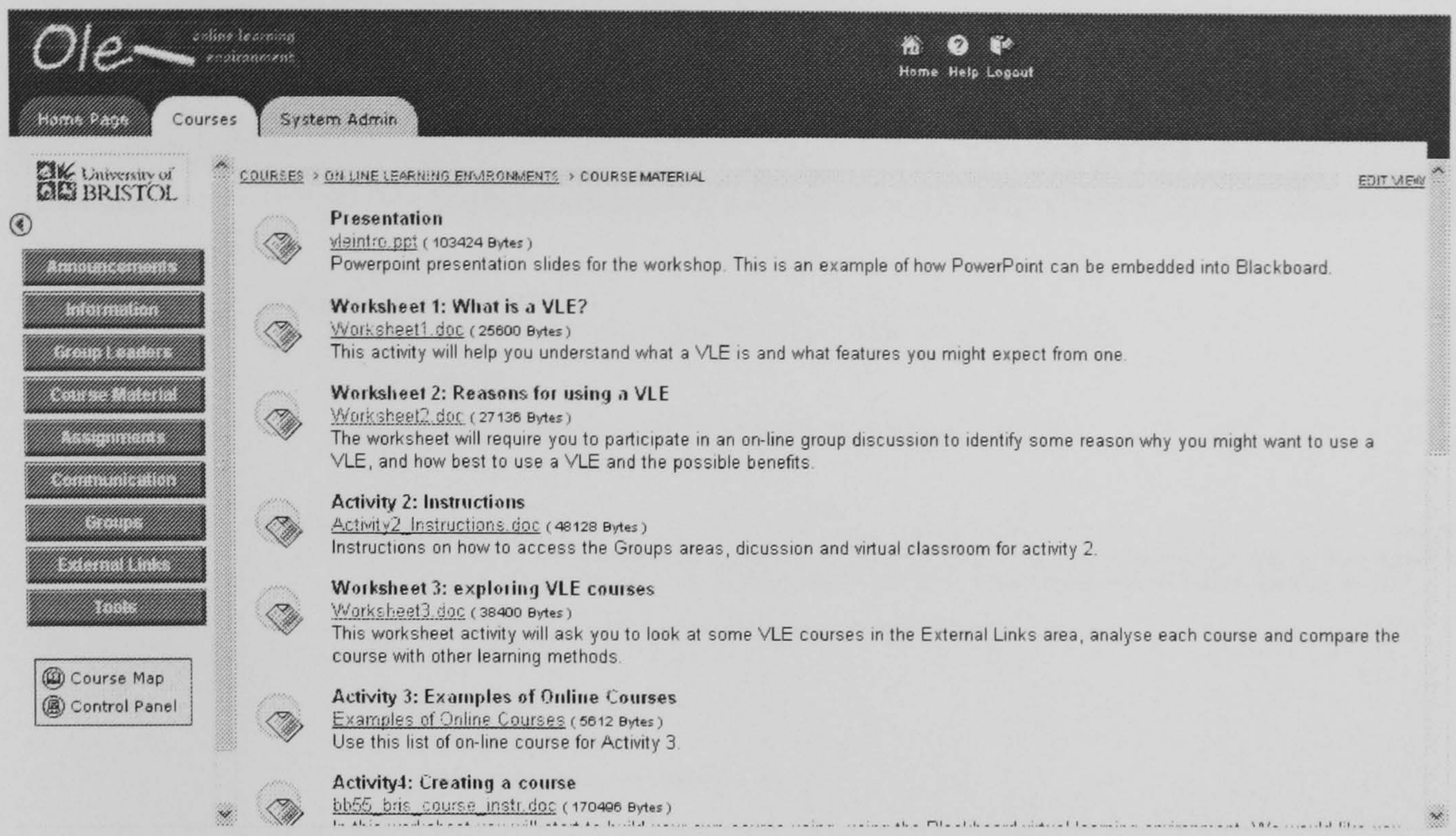

Figure 5: A Blackboard course screen showing the 'Course Documents' section.

Files can be uploaded quite easily using a Web form on the Control Panel (see 2.5.5). Instructors have freedom within a course section to organise folders and materials however they like. Assuming the names of folders are obvious and understood to other users this '*virtual filing cabinet*' is potentially very useful to lecturer(s) and students. Documents can be updated by simply uploading the new version so the file store is always accurate.

2.5.3 Assessment oriented tools

Assessments – quizzes and surveys using various question types (multiple choice, true/false, missing words) – can be constructed then made available between any two dates or constantly (**Figure 6**). The lecturer can configure an assessment using a series of Web forms. The system marks assessments on completion by a student and stores the results in a "Gradebook" area visible to Instructors only. This allows marks to be viewed by user name or assessment taken. Results can be exported as a text or spreadsheet file for further analysis or archiving. Students can see their own marks displayed in a 'View Grades' section. There is a 'Digital Dropbox' for individual students to upload files such as assignments for viewing by lecturers.

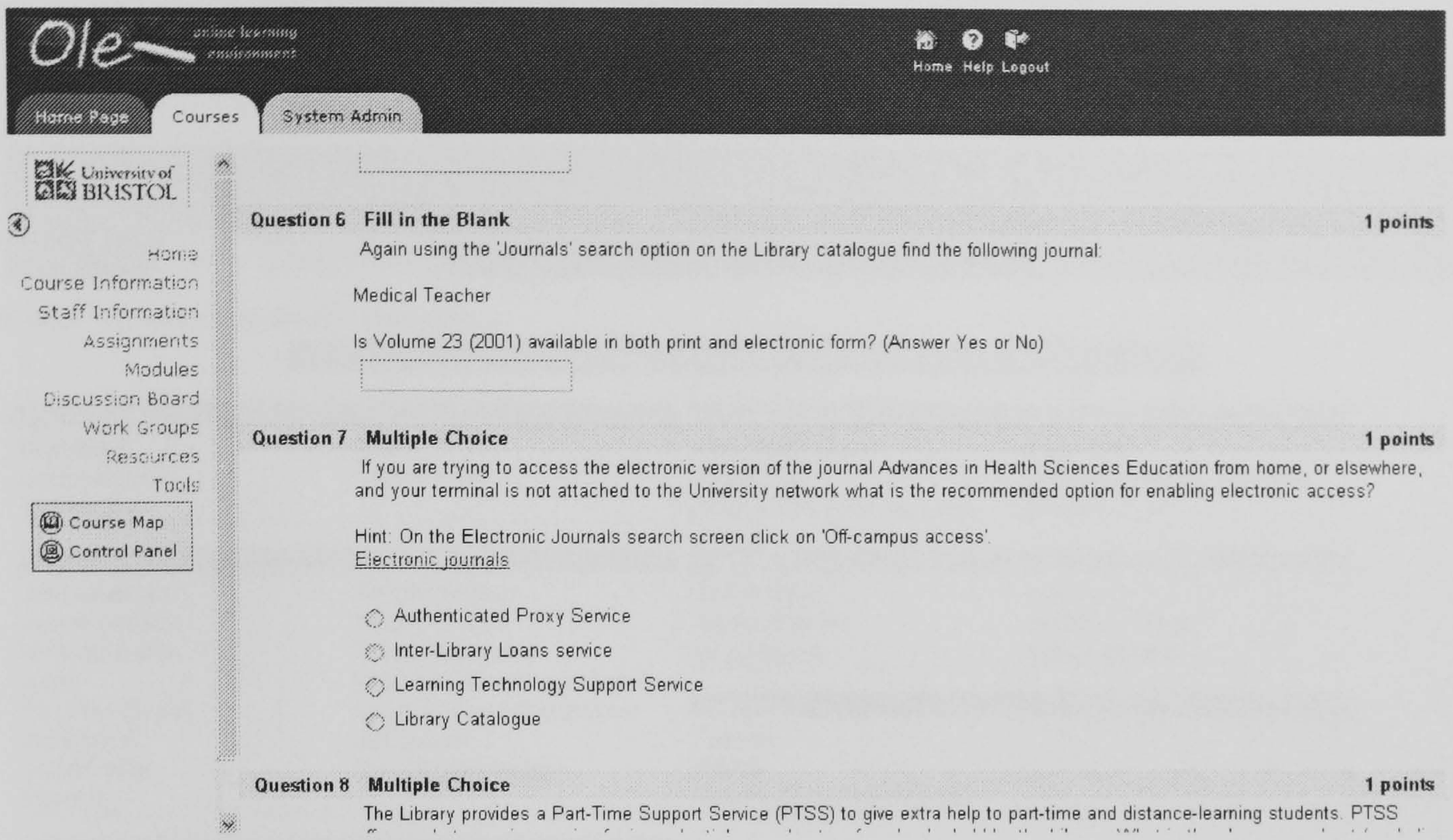

Figure 6: An assessment in Blackboard

2.5.4 Group organisation and student oriented tools

Subsections can be set up within a course for 'Groups'. These are areas to which access can be restricted to a subset of students (a tutorial group perhaps), with discussion board, group email and file upload facilities. The "File Exchange" feature for uploading files enables students to share their work online but unlike the main content areas, folders cannot be created so these files cannot be organised and simply appear in upload date order.

The student tools include an 'Address Book', 'Calendar' or online diary, a 'Tasks' list and a facility for each student to create a homepage (containing some short text, a picture and three 'Favorite Web Site' links). It should be noted that all these features are located within each particular course and cannot be transferred to other courses even though most students will be enrolled on several courses.

2.5.5 Administration oriented tools

For course "Instructors" there is a Control Panel to configure courses and upload materials (**Figure 7**). Students have the 'Edit Your Homepage' feature within

courses mentioned above and also a 'Personal Information' section linked from the main Blackboard welcome page (**Figure 2**) for changing their password and other settings.

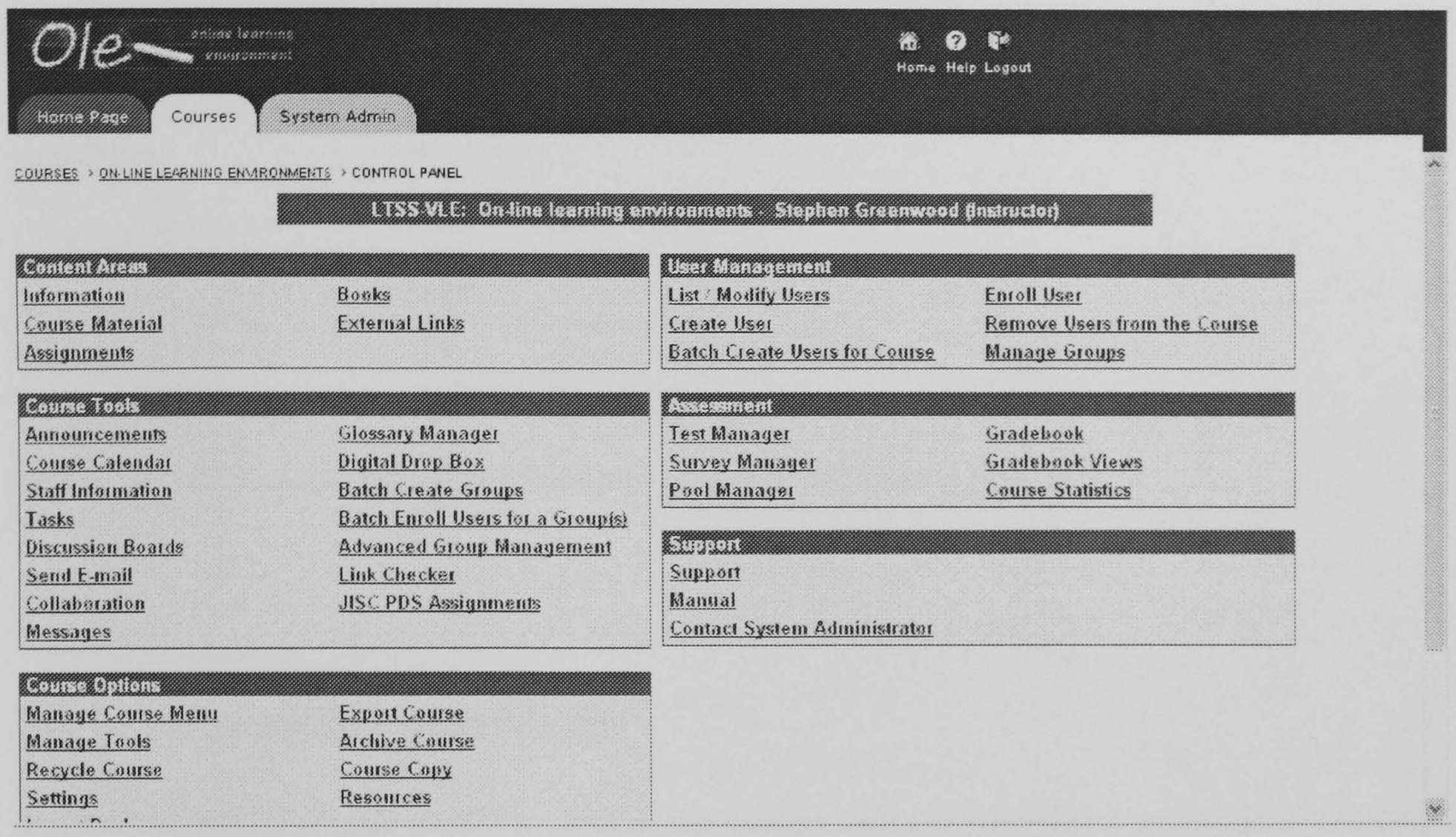

Figure 7: Blackboard Control Panel for instructors to configure courses and upload materials

Most administration is through the completion of Web forms but batch enrolment of students requires the upload of specially configured text files containing student details. Manual enrolment of individual students is also possible by searching on the system for names to add (**Figure 8**). Manual and batch enrolment are relatively simple tasks to perform, but for large numbers of students and courses they could quickly become onerous, especially if repeated each year or term. Lecturers may not even have access to the relevant information (student usernames, course and group assignments) to do this.

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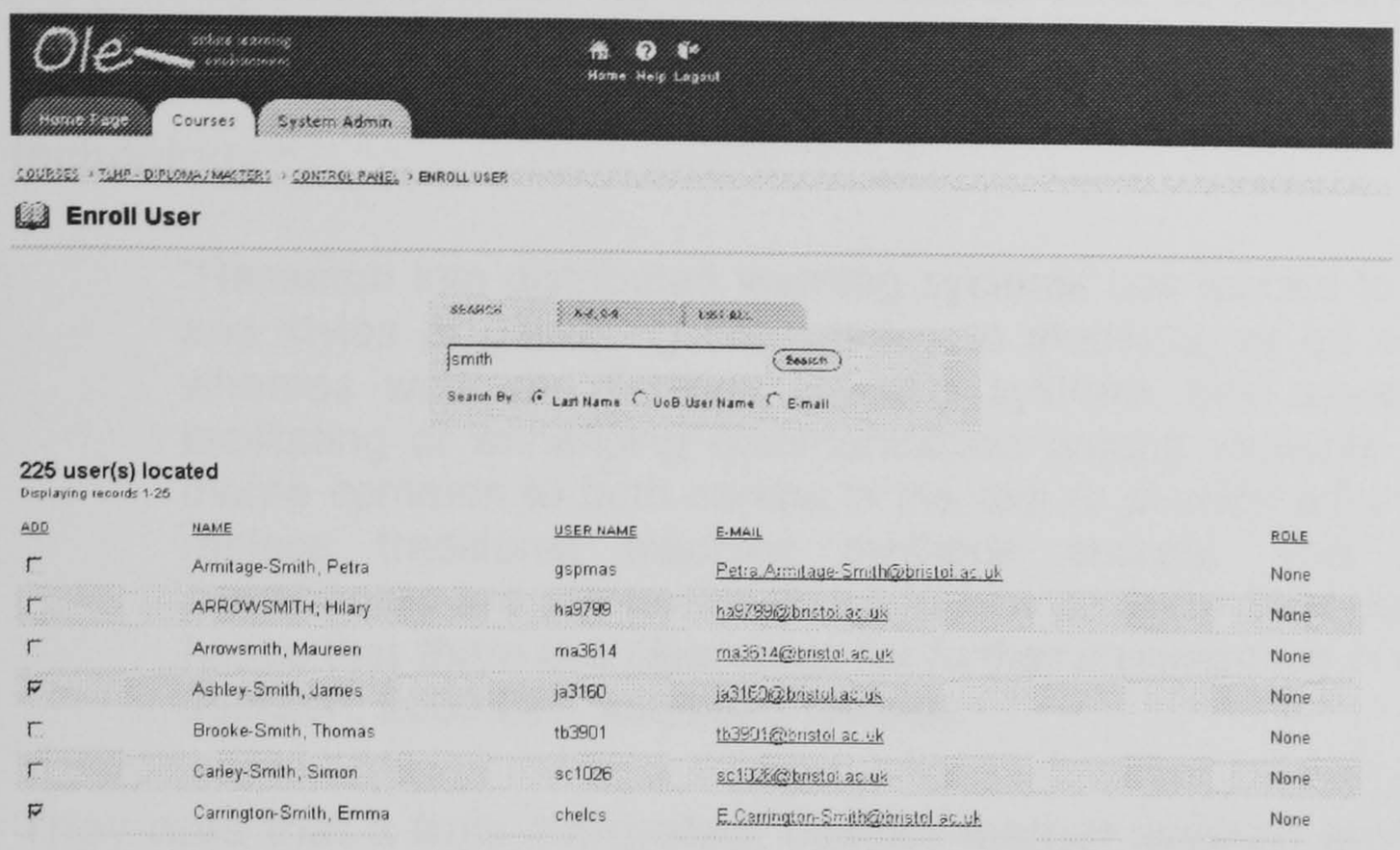


Figure 8: selecting users for enrolment on a Blackboard course

2.6 Research into VLEs

Research into the use of ICTs, whilst containing some excellent work, is limited by a lack of coherent theoretical underpinning (Underwood, 2004). Research on Web-based learning has also yet to form a cohesive set of methods – despite the existence of fruitful prior research on the various component technologies: computers and the use of video, audio, text, images – or make useful generalisations across different subject areas (Hannafin & Kim, 2003). Others argue that information systems research (of which VLE research can also be seen as a subset) has tended to be dominated by a positivistic paradigm (Chen & Hirschheim, 2004). There is probably a good deal of truth in these views and research on VLEs is in its infancy. Because of the complexity of such systems and, in particular, the complexity of the human social interactions involved, studies taking a more qualitative, perhaps socio-cultural or sociological approaches are likely to be informative (see 2.11, 2.12). Nonetheless, research relevant to VLE use is presented below and it highlights the relatively limited extent to which VLEs are being developed and used.

Anderson & Jackson (2000) surveyed computer based distributed and distance learning, highlighting the trends evident through past projects. Their focus was "not on any organisational, managerial or financial considerations, but on computer software and hardware solutions that have been proposed and implemented" (Anderson & Jackson, 2000:214). They made a distinction between systems aimed at supporting *distributed learning* (tutorial-, simulation- or data-based) and those for

supporting *distance learning* (communication tools to support learners). They found that research on both approaches has focused on highly specific facets of technology[20].

> "Research into distributed learning systems has tended to concentrate on methods and styles of delivering courseware to students, or on supporting practical work, whereas work on distance learning systems has usually been concerned with facilitating or enhancing communication among students and tutors. That said, a theme common to both camps is the aim to provide adjunct support rather than to replace traditional teaching methods entirely. This perhaps suggests that *practitioners are still uncertain as to how to make best use of the new media*, and hence that *there is a clear need for further investigation in this regard*." (Anderson & Jackson, 2000:223, emphasis added).

They note that a truly integrated, flexible learner support environment had yet to be created that builds on the experience of the earlier developments they had reviewed, in part because of the wide range of learning styles with which any solution would need to cope. Sheard & Lynch (2003), also confirm the necessity for Web-based learning environments to cater for diverse learner needs and to facilitate learner transition into such systems. Much research performed on systems for distributed and distance learning has been narrow in scope (Anderson & Jackson, 2000), confirmed more recently by others (Hannafin & Kim, 2003). Stiles also recognises the need to refocus attention on designing effective learning environments.

> "Using Virtual Learning Environments (VLEs) poses important educational issues for Universities. Without addressing the issues of effective learning, their use can compound the mistakes of the past and leave the learner with a passive, unengaging experience leading to surface learning. Educators need to recognise that learning is a social process and that providing an effective learning environment which facilitates the active acquisition of subject-specific and general expertise, and addresses the need to adopt a specific subject or professional culture, requires more than electronically delivered course notes and email discussion." (Stiles, 2000: Abstract).[21]

Such arguments are reinforced by the findings of VLE implementation studies elsewhere. The University of Bath (CDNTL, 2001) conducted a pilot evaluation of a VLE (Blackboard). This year-long study showed that there was limited uptake in most participating departments. Whilst students and staff saw advantages in making materials available, it was felt that more wholesale adoption was necessary. Specifically, bulletin boards, newsgroups and e-mail lists with only a couple of contributions per month were not seen as useful. Students would cease using a site if they perceived the lecturer was absent or could not provide added value via the site.

Richardson & Turner (2000) conducted a very thorough analysis of the student experience and tasks set within an online learning environment. The need for "greater awareness of how to facilitate electronic discussions" (Richardson & Turner, 2000:124) amongst tutors was highlighted (see also section 2.7). They concluded that effective VLEs should support active rather than passive learning and balance face-to-face meetings with online (asynchronous) contributions.

A quantitative survey of Blackboard use at the University of Durham found that the most popular tools were: document uploading, announcements, calendar, e-mail and Web links. Discussion boards were created by a majority of staff but used by a minority of students. Assessment tools and most other features were only used by a minority of staff and hardly at all by students (University of Durham, 2004). Perhaps most interesting was that 69.2% (2001) and 69.1% (2004) of staff stated that Blackboard could help them do certain things better but only 17.9% and 15.5% respectively said their basic approach to teaching was changing as a result of using it. This serves to underpin Anderson & Jackson's findings and Stile's arguments that teachers in HE are as yet ill equipped to make effective use of VLEs and are likely to use those features which save the most effort.

Despite Stile's (2000) argument that we require "more than electronically delivered course notes and email discussion", this is apparently is mainly what is being provided and used.

2.7 Computer mediated communication

CMC refers to the use of electronic communication tools such as discussion boards, bulletin boards, chat rooms and conferencing systems, all of which are available within Blackboard. A short consideration of research in this area is included here to inform discussion of the communication aspects of Blackboard use.

If well designed and perceived as valuable within a course, CMC can be very effective at enabling collaborative learning (Kaye, 1995). Conversely, CMC tools that are not well integrated and are used only infrequently by teachers are bound to encourage little activity (CDNTL, 2001). Another CMC tool, bulletin boards, also elicits a variable response from students, who may adopt them if they see it has a practical use:

> "Computer-supported learning is most effective when it provides a solution to an identified problem in an existing (campus or distance) learning environment." (English & Yazdani, 1999:13).

Students' purposes in using CMC are also important. Henri (1995) studied this in a CMC system on a distance-learning course. Only 1 in 3 messages were classed as 'interactive', but students *were* thought to be using CMC to validate their own learning constructs and check their understanding.

Students' knowledge, social interactions and motivation are important in helping them find additional resources and contribute to tutorials however (Wilson & Whitelock, 1997). It is also evident that cultural as well as cognitive factors are at play in the use of CMC. Over time, culture and usage interact to produce a range of responses to such environments, related to expectations about usage and their connection to other activities (McAteer et al., 1997). Important questions that have been raised are: is CMC significantly different from face-to-face group interaction? What are the implications for design? (Davies, 1995).

What is clear is that success or failure in CMC is the result of a number of complex interactions between various social and cultural factors including: levels of learner control and social 'presence', the context and structure of discussions, feedback available, and the nature of any dialogue (Vrasidas, 2003). Some suggest it might even be explained by pseudo-biological or evolutionary processes (Kock, 2004). CMC remains prominent in nearly all VLEs because of its asynchronous nature – freeing students and staff from the constraints of time and place – and enabling the archiving of discussions for newcomers (and teachers) (Crook & Light, 2002).

A concern of many teachers not yet using CMC is that it is a "time-trap", swallowing up time for moderating, supporting and correcting student discussion. Research is emerging, however, that shows student peer led discussions can be efficient and effective (Rourke & Anderson, 2002). Students prefer them because they are responsive and the discussions are useful in achieving higher-order learning objectives. The researcher in this case continued to participate, pointing out omissions and misconceptions, but generally on a much less intensive basis than if they had moderated the entire group themselves.

Related closely to this issue is institutions' provision (or lack) of support and training in effective online moderation. Tarbin and Trevit report the difficulties of supporting staff in managing CMC. They question lecturers' ability to support students in

learning new forms of discourse appropriate to online study and, in turn, institutions' ability to provide support and training for lecturers (Tarbin & Trevit, 2001). Things have moved on in an important respect, however. They refer to first year students who are "often engaging in e-mail technology for the first time" (p70). The student body is now far more experienced in electronic communication, with 71% of secondary school pupils having their own e-mail address in 2001, many of whom are now entering HE (Somekh et al., 2002). Nonetheless, this does not mean they are necessarily any more skilled at online discussion for learning purposes.

The difficulties of supporting online collaboration have been addressed by Gilly Salmon, who has developed a 5-step model describing how people engage with online computer mediated communication (CMC) environments (Salmon, 2000a)[22](Salmon, 2000b). This has received considerable attention in the research community as a useful model, but as yet does not seem to have inspired a large number of research papers specifically investigating its efficacy. Additionally it is best focussed at the level of individual tutors aiming to facilitate online discussions on specific courses and thus is less relevant to the current more wide-ranging study.

2.8 Expectations of learners

Developments in schools are set to have a major impact on the expectations of those entering the first year of their university careers. The National Grid for Learning[23] is perhaps the most high profile government instrument of change in this area. NGfL is a major undertaking involving the production not just of content, but also connectivity and staff development in all schools.

> "By 2002, all schools will be connected to the superhighway, free of charge; half a million teachers will be trained; and our children will be leaving school IT-literate, having been able to exploit the best that technology can offer." Taken from the foreword to *Connecting the Learning Society* (Blair, 1998).

Alongside the increasing use of technology in society, initiatives like NGfL, LearnDirect[24] and Open2.net[25] mean that school-leavers and other university entrants are becoming increasingly 'Web-aware' and competent in the use of digital technologies.

Whilst the relatively simplistic polemic of the 'digital divide' exploited by politicians – which see ICTs as an unconditional good and is apparently grounded in economic concerns (Selwyn & Gorard, 2003) – is problematic and certainly requires more

sophisticated analysis (Selwyn, 2004), ICT is being used increasingly in both formal and informal learning activities. A report on a project run by the British Educational Communications and Technology Agency (BECTA, 2001) studied 2,179 pupils in 60 schools (30 primary, 25 secondary and 5 special). The following findings underline popular suspicions about youth culture and access to digital technologies:

- 88% of KS4 pupils[26] had access to a computer in the home
- 64% of secondary school pupils had access to the Internet at home
- 67% of secondary school pupils had their own e-mail address
- 67% of KS4 pupils had created Web pages
- 60% of KS4 pupils owned a mobile phone

In the final report, 90.1% of pupils had a computer at home and 78.7% used the Internet outside school (Somekh et al., 2002). This tallies with estimates from Facer et. al. (2003) of only 24-12% of young people not having access to a computer in the home in 2001, though differences existing between different socio-economic and ethnic groups are also noted. Cohorts of students with at least this level of access to technology will have entered universities by 2004. Estimates for higher education are that around two thirds of students may have access to a computer at home and that those who do so make more use of computers on campus (Selwyn et al., 2002).

Increasingly, everyday interactions will depend on digital technologies (shopping, contacting friends and colleagues). It will become increasingly natural for students to expect universities to provide similar functionality to support their learning. The details and consequences of these new interactions are difficult to predict. The Internet is upturning old beliefs about collectivism, expertise and the use of knowledge - enabling individuals to have effects far beyond their own circumstance that would hitherto be unthinkable (Lewis, 2001). Caution should be exercised here, however. Tasks that can easily be done anytime, anywhere via the Internet are likely to be qualitatively different from the more active work of learning. Learning requires a relevant context and a readiness in the learner so the claims for new technologies may not transfer from claims based upon shopping and social communication on the Internet (Crook & Light, 2002). Nonetheless, clearly the Internet opens up many possibilities for engaging in learning in ways that are less time and location dependant than more formal teaching settings.

How, where and when students learn to use ICT has been an important research topic in recent years. The 'ScreenPlay' project found much evidence of the 'embeddedness' of digital technologies in school pupils' lives – in particular comparing their use of computers at school and in the home (Facer et al., 2003). The formalised use of ICTs in school settings varies considerably from the much less structured use in the home. Young people are learning more about a variety of computer applications in less formal environments, rather than formal ICT lessons as the rhetoric would have us believe.

Crook (2002; Crook & Light, 2002) has studied the use of ICT by university students and discusses the significance of this relationship between formal and informal learning. The former refers to the kind of structured schooling we associate with traditional university settings – lectures, tutorials, experiments, examinations. The latter relates to self-motivated engagement in reading, listening, talking, playing – a kind of "unhampered participation in a meaningful setting" (Illitch, 1973) [27]. Crook argues that the rush towards the virtual university tends to devalue the important role of the non-virtual structures and practices of formal education, and the preference of students themselves for keeping formal learning activities separate from less formal learning and social participation in university life. He concludes that sensitive planning of virtual environments can provide relevant structures without disrupting the balance between informal and formal learning. Crook and Light (2002) discuss how informal learning is a more autonomous (learner-controlled) extension of formal learning and how ICT use can blur the boundaries between formal and informal learning by promoting unstructured exploration of topics and tasks. They urge us to ground any development of virtual learning in improved theories of how students make use of informal learning practices and how this relates to the expectations and contexts of formal learning. Similar issues can be said to apply to the implementation of virtual learning in relation to formal and informal staff practices. Staff and students all need to learn how to make effective use of the technologies.

Although ICT can provide opportunities for learner autonomy and discovery learning, this is likely to be most fruitful with intelligent guidance from the teacher. As one case study has shown, there is a pivotal role for teachers in the effective use of interactive ICT packages in schools (Lim & Barnes, 2002). Students in higher education are in a much more autonomous position than pupils in a school, but must also need some guidance, help or scaffolding in navigating the array of information

and learning resources at their disposal. The lecturer's role in facilitating and directing the use of ICT tools, therefore, is likely to be just as important as it is in schools.

With this as a background, it is interesting to note that students responding to a survey at the University of Bristol were generally very positive about e-learning and would welcome more use of online technologies, but reported patchy usage by teachers and departments. More complex uses of communications technology were not being realised – e-mail was used to communicate with groups of students but there had been much less online collaborative work (O'Leary et al., 2001). Therefore the Bristol context is likely to be analogous to that found elsewhere (Anderson & Jackson, 2000; Stiles, 2000; CDNTL, 2001; University of Durham, 2004).

2.9 Expectations of staff

Staff in HEIs find their work being redefined and restructured in response to the way courses must be delivered to larger numbers of students with fewer resources and limited time. Academics in particular would consider whether to use learning technologies in the light of the pressures of their existing work, the level of institutional support and leadership and the match between what they need to achieve and the capacity of the technology to provide it.

The nature of most peoples' employment is also changing and becoming less secure. In the context of such pressures, any technology that is going to make the job easier might be welcomed, as long as one has the time and support to implement it. Staff surveys have shown that even the most technologically aware teachers do not always make use of technology in their teaching (Jones, 2000), but can be quite positive in their attitude to the future use of technology in supporting specific learning and teaching activities (Jones, 2001). This suggests that staff are willing, but somehow unable, to implement novel ways of technology supported learning. As mentioned above (2.8), the lecturers will have a critical role in the extent to which a learning technology is adopted effectively. They should be able to recognise the benefits and limits of the software, design activities to support its use and to perhaps reconsider and modify these activities in the light of experience (Lim

& Barnes, 2002). In order to do this they may need to invest time in finding out about the software and learning about effective online pedagogy.

The institutional context is also likely to influence uptake and staff expectations of the worth of engaging with learning technology. Even where a number of enthusiasts are involved in using and promoting learning technologies[28], a lack of strategic direction (University of Bristol, 2000: section 1.2) can be de-motivating. Moreover, strategies which take account of the various needs and cultural perspectives of different staff groups are essential for successful implementation of learning technologies (Lisewski, 2004). This might be driven from the top down in 'transformational' mode or from the bottom up in 'substitutional' mode, or ideally both in concert (Westera, 2004).

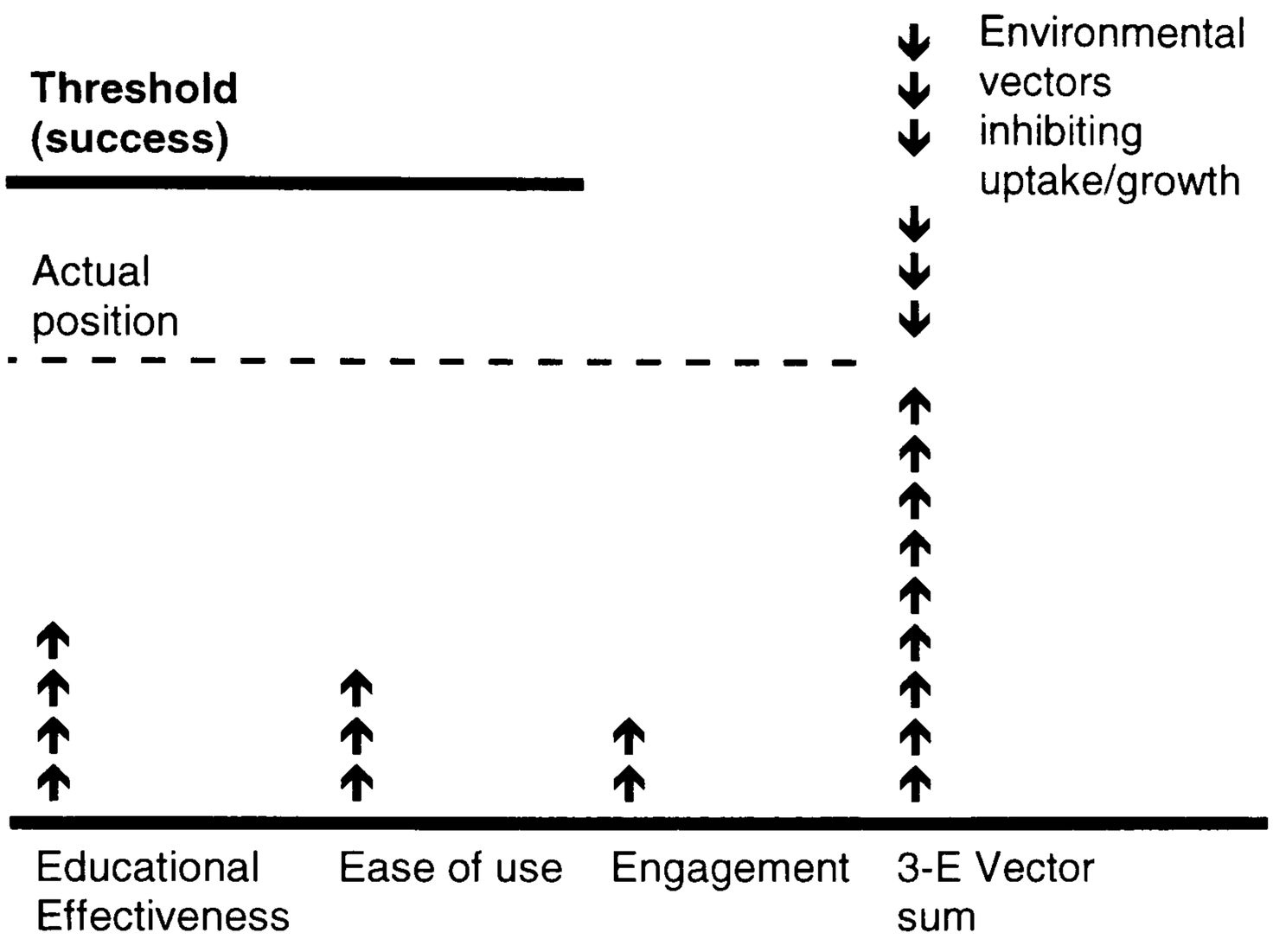
The extent to which a technology is or can become integral to existing activities could also determine the likelihood of adoption. If staff perceive limited harmony between their main work goals and the capabilities of the technology there is less likelihood of adoption. Moreover, if the tool is also not easily learned this will represent an additional barrier.

> "Perhaps the central problem of [human computer interaction] can be defined as that of optimal integration of computer tools into the structure of human activity" (Kaptelinin, 1996: 51).

If on the other hand a technology can be adopted easily and quickly, and seems to provide at least some desirable functions then this will facilitate uptake (desired functions have also been theorised as 'affordances', to which we turn in section 2.10).

Collis & Moonen attempt to assess the likelihood of adoption through their 4E Model (Collis & Moonen, 2001), which holds that four "vectors" are involved in the adoption of a learning technology (Figure 9). It is claimed that this is based on lessons learned from supporting and researching technology implementation. There are, however, questions which reveal the simplicity of this approach. What constitutes success, and where does one set the threshold? Should one concentrate on enabling the use of a broader range of functions or on getting the highest percentage of staff using the system for a subset of features? Clearly the threshold for success will depend on the stage of implementation and objectives of the implementation strategy. The 4E model can be applied most efficiently if one knows exactly what success looks like.

Figure 9: The 4-E model showing how various interrelated factors are involved in the likelihood of use for educational software (Collis & Moonen, 2001).



The model does not ignore the social context in which implementation occurs, but does not explicitly theorise it and hardly draws at all on the socio-cultural or sociological literature (see 2.11, 2.12). These may be critical when it comes to describing the processes involved in developing effective online learning appropriate for various institutions.

2.10 Affordances

The concept of affordance originated in the work of Gibson (1979). Donald Norman (1989) later popularised it within the HCI (human computer interface) research community and beyond. An affordance is what something 'is for'. Classically, a door 'affords' opening, a button 'affords' pressing. Gibson's concept is described as follows:

> "'Affordance' refers to the perceived and actual properties of a thing, primarily those functional properties that determine how the thing could possibly be used" (Salomon, 1993:51)

More complex tasks can be made up of nested affordances. Exploration of a system or environment can involve sequential affordances (Gaver, 1991).

The term has suffered from a lack of definition (McGrenere & Ho, 2000) . While Gibson thought an affordance (or 'action possibility') was either there or it was not, Norman and others argue that affordances (or 'perceived suggestions') can exist at a range of levels depending on the circumstances and on the person experiencing the affordance. Different people ('actors') may perceive affordances differently. The example given is of stairs affording climbing but the climb being harder for some than others. Variations in degrees of affordance mean they can be more or less prominent and more or less easy to take advantage of. This is reflected in Figure 10, which also emphasises the necessity for good design if people are to use the affordances a system makes available to best advantage. This is certainly important in computer interface design where the user is presented with only the designer's vista from which to ascertain correct usage.

Norman has written about affordances in human interactions with technological equipment, including computers, and suggests the concept is central to the extent to which such equipment is used effectively, and that this must be considered in their design.

> "We tend to use objects in ways suggested by the most salient perceived affordances, not in ways that are difficult to discover (hence the fact that many owners of electronic devices often fail to use some of their most powerful features – indeed, often do not even know of their existence)." (Norman & Dunaeff, 1994:106)

Norman (1998) argues that the ability of users to discern the correct action to take when operating a microwave, telephone or computer is often hampered by the design of the equipment. Computer environments, being in many senses artificial, are perhaps particularly susceptible to the way poor (and good) design influences how it is used. In a form of CMC known as electronic conferencing it has been observed that "Software developers may shape the kinds of social interactions possible between users and communities of users." (Barnes, 2000:239).

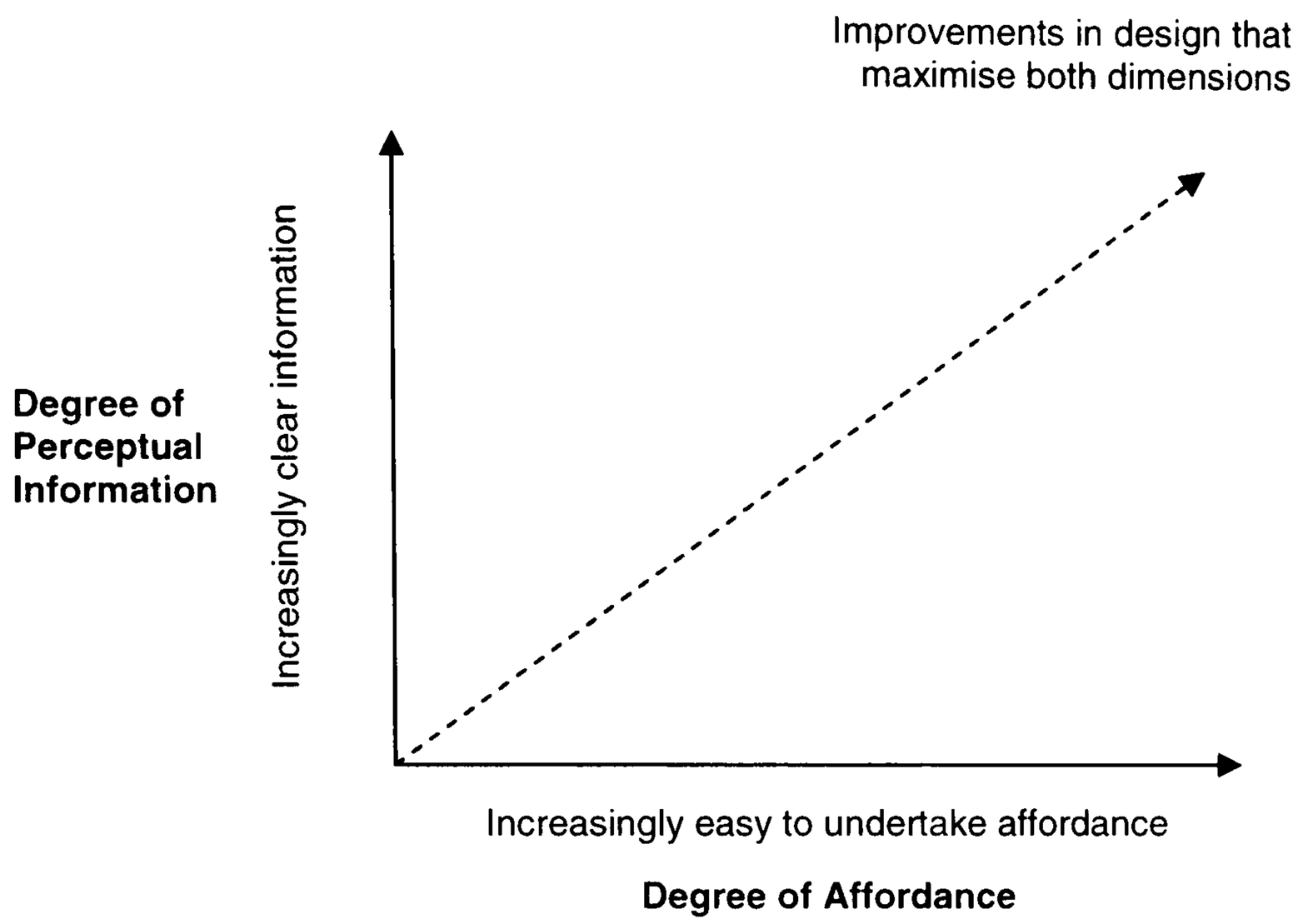


Figure 10: Representing an affordance and the information that specifies the affordance on a continuum, taken from (McGrenere & Ho, 2000:185) .

Considering the needs of the end user is of course crucial in achieving a good match between designed and actual, useful affordances.

> "The HCI community has largely focussed on usability at the expense of usefulness... The usefulness is determined by what the design affords... and whether these affordances match the goals of the user... Usable designs have information specifying affordances that accounts for various attributes of the end-users, including their cultural conventions and the level of expertise" (McGrenere & Ho, 2000) .

As part of this consideration of user needs, Conole & Dyke have set about describing the affordances of information and communication technologies (ICTs) as a prerequisite to developing a taxonomy of ICT affordances. Their initial article (Conole & Dyke, 2004b) has sparked off a useful discussion (Boyle & Cook, 2004; Conole & Dyke, 2004a) which will no doubt illuminate some generic affordances to assist in theorising the use of ICTs.

Slightly earlier than this, though not actually described as affordances, a delineation of the outcomes of effective online learning – **dialogue**, **involvement**, **support** and **control** – has been presented by Coomey & Stephenson (2001). In addition Collis & Moonen (2001) have stressed the importance of the balance between **acquisition** of knowledge and **participation** in collaborative learning in online environments. Both these approaches appear to be a practical way of accessing some relevant affordances (see 2.13 for an integration of these into the analytical framework).

2.11 Socio-cultural perspectives and online learning

Recent research in education has featured a resurgence of interest in the social dimensions of learning, contrasting with the earlier post-war emphasis on individual cognition (Salomon & Perkins, 1998). Thought and behaviour is now seen as occurring not just in the mind of the individual but as something shared across the various social groupings in which people are involved. Activity, including learning, is embedded in a social context involving various different human 'actors' and also the tools or 'artefacts' used in the activity. Cognition is seen as emanating from this social context and then being internalised by the individual, rather than the other way round. This concept of the primacy of social context originates from Vygotsky (1978) and other early 20th century Russian psychologists. Intelligence is said to be 'distributed' across the people and tools involved in any activity (Salomon, 1993). Part of the intelligence required for an activity (a maths project perhaps) is embedded within the tools (spreadsheets, calculators, worksheets) and other humans involved (students/teachers). Intelligence can therefore be augmented with guided participation, with inscriptional systems (including computers) and individuals' own developing knowledge and skill within the situation (Pea, 1993). Viewed from this 'distributed cognition' perspective (Salomon, 1993), the role of VLEs should be to facilitate appropriate social interactions that enable meaningful group tasks to be completed collaboratively.

Some theories emphasise the idea that all learning activities are necessarily situated in a particular context (Brown et al., 1989) – 'situated action' or 'situated cognition', arising from work on apprenticeship (Lave, 1988) – and that all learning involves 'legitimate participation' in social groupings sharing common learning or activity goals (Lave & Wenger, 2002). Such so called 'communities of practice' (Wenger, 2000) involve the construction of knowledge in the interplay between social competence (ability to learn and adapt within social groupings) and personal experience. This in turn necessarily influences the knowledge and/or practice of the community, so learning combines personal transformation with the evolution of social structures. Wenger (2000) describes three modes of belonging to a community of practice: **engagement** (in mutually agreed tasks and the production of artefacts), **imagination** (reflection upon or reorientation of practice) and **alignment** (with local activities and other processes). Together these can be said to define the workings of a community of practice.

Communities "emerge spontaneously from (largely informal) networking among groups of individuals who have similar work-related activities and interests." (Swan et al., 2002:478). University teachers might be involved in various communities of practice relating to their research, subject discipline and teaching. Teachers' use of a VLE can be conceptualised in terms of their involvement in such communities, which place varying priorities on the support of learning and have a range of shared knowledge and competencies in relation to facilitating online learning.

A difficulty with conceptualising VLE use within a community of practice model, however, is that the individuals involved may be unlikely to consider themselves part of any "VLE community". Professional, subject-based, academic and even social communities are liable to be more prominent. Jones (2004) suggests that a 'network' metaphor is more appropriate for modelling the use of learning technologies based on computer networks (as VLEs are):

> "The growth of the Web and the drive to digitise and make accessible a range of reified 'learning objects' has made the research focus on social process, understood as group collaboration, too narrow. It is important now to understand the relationship of individuals and groups to artefacts as a sense making activity. The move from interaction with computers to interaction through computers has now moved on to interaction in relation to computer networks." (Jones, 2004:89).

Thus, those involved in the use of VLEs take part in a series of interactions with the VLE and others involved in using it. These interactions may be in close-knit or more dispersed social networks. Brown and Duguid (2002b) distinguish between 'networks of practice' – people working on similar practices but who may rarely meet and never become familiar; and 'communities of practice' – people working together more closely on the same or similar tasks.

Another important socio-cultural approach requiring a mention here is activity theory. In common with other models, this assumes that that behaviour is social in origin, that human activity is collective and mediated through the use of tools in (everyday) contexts (Russell, 2002). The focus is on the activity itself, which might be nested within other activities – presenting rich analytical opportunities.

Nardi (1996) has compared activity theory, situated action and distributed cognition models (Table 2). This places activity theory between the analysis of complex systems (distributed cognition) and the analysis of specific contexts (situated action). That said, most activities will in fact consist of a number of interrelated activities, making analysis of multifaceted pursuits such as the use of VLEs quite

complex. Nonetheless, a highly relevant view from activity theory is that learning and participation in work are inseparable. Activity theory can also demonstrate the interdependencies between people and between people and artefacts/tools (Billett, 2002). VLEs require the interaction of numerous individuals across an institution, each having to learn how to use it within their work context. Therefore this perspective may be pertinent to how the use of VLEs develops and how the technology changes practice.

> "...technologies can shape both the practice and engagement in that practice, as they configure workplace tasks, division of labour and shape workplace communications" (Billett, 2002: 92).

Table 2: Differences between situated cognition, activity theory and distributed cognition, from Nardi (1996).

	situated cognition	**activity theory**	**distributed cognition**
Unit of analysis:	A situated activity, people acting in a setting.	An 'activity' composed of dynamically related operations, actions, subjects and objects.	A "cognitive system composed of individuals and the artefacts they use" (p77).
Key features of the treatment of the unit of analysis:	Transient, one-off, emergent, unplanned, persons are purely reactive to a situation, almost behaviourist.	An object-goal, perhaps shared by a group of individuals, is central to analysis. Activities persist and can change over time.	Concerned with structure and representations (both mental and symbolic) within the system. Action is mediated by (shared / persistent) tools.
Stance towards artefacts:	Humans and things (machines, tools) are qualitatively different.	Artefacts and people are different, as people are sentient, moral beings not just 'nodes' in a system.	Artefacts and people are equivalent agents in a system
Stance towards people (actors, subjects):	Unable to provide reliable information.	Important source of interpretive information about the meaning and changing nature of activities.	Important source of interpretive information about the meaning of artefacts and tools and their use within systems.
Suitable methodologies:	Video observation, electronic activity logs.	Interviews, ethnography, observation, historical material	

This strong embedding in the social fabric leads us to a consideration of the sociological perspectives which might be of interest in understanding VLE implementation.

2.12 Sociological interpretations of the development of online learning environments

There is a growing realisation of the primacy of human and organisational barriers to technological implementation (Orlikowski, 1992; DeSanctis & Poole, 1994; Orlikowski, 2000). As tools for creating material for the Web become more user-friendly, ease of use becomes a less obvious barrier to implementation. Research is beginning to challenge previous concepts of 'computer literacy' and 'technophobia' amongst staff, and instead point to difficulties staff have in incorporating technology into existing practices and organisational structures (Salmon & Jones, 2004).

Technology implementation relies on human and organisational factors as much as technical ones. A dynamic interrelationship between these is to be expected since technology is always used within a particular socio-historical context by human agents who can decide whether, and how, to use it.

> "Technologies always enter into already existing socially constructed worlds... Yet the complexities involved in the 'socialisation' of technology are more than ones of design. Interestingly, such complexities start to emerge if one takes the user... rather than, as so much of the [previous] speculative literature has done, the technology, as centre of analysis." (Facer et al., 2003:224-5).

Thus it is the user (in context) who can help us understand the social environment within which a VLE is being implemented and used.

Some have brought a sociological approach to bear on the phenomenon of technological change. In re-conceptualising Gidden's ideas on the duality of (social) structure, Orlikowski (1992) talks about the "duality of technology". Looking back over the history of research into technological innovation, Orlikowski shows there has been a shift, since the 1950s, from seeing technology as an external driving force, through attempts to understand how human agents use technology and finally to concepts of a reciprocal interaction between the two.

> "The early work assumed technology to be an objective, external force that would have (relatively) deterministic impacts on organisational properties such as structure. In contrast, a later group of researchers focussed on the human action aspect of technology, seeing it more as a product of shared interpretations or interventions. The third, and more recent, work on technology has reverted to a 'soft' determinism where technology is posited as an external force having impacts, but where these impacts are moderated by human actors and organisational contexts." (Orlikowski,1992: 399-400).

Orlikowski then adapts Gidden's theory of '*structuration*' (Giddens, 1984) to explore this interaction between technology and human actions. Structuration[29] sees humans as reflective and knowledgeable 'agents', seeking to optimise their working

practices. In interacting with each other and the technology, these agents or 'social actors' continually update three fundamental elements: *meaning* (shared interpretations which shape and are shaped by the use of technology), *power* (the 'transformative capacity' of people to change things, get things done) and *norms* (rules for how things get done). A criticism of this approach has been that, if it is to be true to Gidden's original ideas, there is little acknowledgement of the material properties (as opposed to the dynamic nature) of technological structures (Munir & Jones, 2004). Nevertheless, structuration is a potent theory where one needs to interpret the actions of individuals within a developing social context.

Another adaptation of Gidden's work is Adaptive Structuration Theory (AST) (DeSanctis & Poole, 1994), applied to technological innovations by taking two main vantage points: (a) the types of structures provided by the technologies and (b) the structures that emerge as people interact with the technologies. This perhaps goes some way towards meeting the critique of Orlikowski's model.

Attempting to formalise the application of structuration to technology use, Werner Rammert sets out twelve "*New rules of sociological method: rethinking technology studies*" (adapted from Giddens, quoted at Appendix 15). These stress the social context of technology and the important role of social actors in determining the course of its development and implementation (Rammert, 1997).

Social actors are operating within subcultures, and conflict between subcultures relevant to technological change has been observed by Jones *et al.* (2000), using structuration theory to explore technology innovation in a firm. They highlighted "very different interpretative schemes adopted by those representing the technical and financial sides of the business" (p169). Specifically, they found that norms within the technical team "emphasized the importance of 'high-technology' solutions to organizational problems which encouraged a long-term rather than a short-term perspective" (p172). This contrasted with the shorter-term and more pragmatic focus of the accountancy team.

Structuration is a powerful model with which to interpret the actions of multiple interest groups in the development of technology and further studies could be envisaged which took this approach. In the meantime, however, it does not necessarily tell us what path might be likely next. To attempt this, Munir & Jones (2004) use actor network theory to synthesise three main propositions in relation to predicting the adoption of a technology.

1. The success of a particular technology will be positively related to the degree to which consumers come to understand it in terms of concepts promoted by its proponent(s) (Problematization).
2. There will be a positive association between the success of a design and the number of its links with important institutional players (Enrolment).
3. There will be a positive association between the success of a design and the number of other services to which it provides exclusive access (Obligatory Passage Points).

In conjunction with explanations based upon structuration, these offer some potential for predictive power in discerning what might happen next in a technological implementation.

2.13 A framework for analysing the use of a VLE

This section will look at ways others have analysed VLEs and, drawing on work presented in previous sections, will discuss the framework used in the current study to investigate the use and perceptions of the Blackboard VLE. This will be done in relation to the general theoretical underpinning of the research, the institutional context and potential affordances for teaching and learning.

2.13.1 General theoretical underpinning

From the various approaches to researching the use of VLEs discussed in this chapter, the following themes seem pertinent and potent.

The literature on online learning, expectations of staff and students all points to the importance of a socio-cultural and sociological perspective in analysing the development and utilisation of a VLE. In particular, the concepts of affordance, networks/communities of practice, subcultures of social actors, structuration and actor network theory contain relevant insights. These are pertinent to investigating perceptions of how the system is being used and perceptions of the social context in which it is being used. As Blackboard is institution-wide so is the social context. Whilst activity theory, distributed cognition and situated learning are powerful theories, they appear more suited to the analysis of specific systems within less

diffuse groups than in the current study. Nonetheless, they bring pertinent perspectives (Table 2).

The Web has evolved into a highly sophisticated medium able to provide integrated services through linked data systems (2.1), but the extent to which this is now evident to end users is something worth investigating in HE. In terms of the functions of VLEs the main areas defined in section 2.5 are used to analyse the quantitative and qualitative data. The activities of **content** upload, **communication** and **assessment** relate to some important educative activities and so are highlighted. Studies elsewhere do seem to have demonstrated use of VLEs tends to be limited to a small number of the features available and the study should try to ascertain whether this is also the case at Bristol.

2.13.2 Institutional context

Levels of interaction are important to understanding the introduction of technology. Collis & Moonen identify four 'perspectives' of flexible learning (Collis & Moonen, 2001). These have been based on their work in VLE development, and used to analyse the success/failure of VLEs in higher education:

- **Institution** – the structure, policy, strategy and culture of the organisation.
- **Implementation** – how can a VLE successfully be introduced, barriers to implementation, issues relating to use by teachers, other staff and learners.
- **Pedagogy** – all aspects relating to the design/enaction of online teaching and learning.
- **Technology** – all aspects relating to the software: issues with the user interface assumptions of the software, support, etc; or hardware: access issues, support, etc.

This enables the issues at each of these different, inter-related, levels to be categorised and analysed in a more meaningful way. The levels are focused mainly on the educational technology itself and the surrounding culture and infrastructure.

2.13.3 Potential affordances for teaching and learning

A number of comparisons exist of software products which can be used to create VLEs[30]. These tend, however, to be feature checklists rather than in-depth analyses

of what an environment can provide in an educational sense. In contrast to these, Britain & Liber (2001) created a "*Framework for Pedagogical Evaluation of Virtual Learning Environments*". They explored the use of two approaches in trying to understand the use of VLEs: Diana Laurillard's Conversational Framework with its various modes of interaction between learners and teachers (Laurillard, 1993; 2002); and a 'Cybernetic Model for evaluating Virtual Learning' based on the 'Viable Systems Model (VSM)' (Beer, 1981) for analysing communication channels between the various members and external stakeholders of an organisation. Laurillard's model offers an educational perspective based around the ability of a VLE to provide for the construction of individualised activities and interactions with students but lacked scrutiny of the management of student groups within the VLE (an important function). The VSM model offers an organisational perspective of the VLE's ability to enable tutors to provide individualised activities to large numbers and various groupings of students. Britain & Liber also discuss learning styles which tend to be marginalised in higher education due to the time required to orient teaching towards each one, but VLEs are potentially well placed to adapt to them. These do not map accurately on to the categories of use described within Blackboard, but some links can be made:

- collaborative learning and discussion-led learning – **communication** areas (discussion board, virtual classroom tool)
- student-centred learning – **student** areas
- resource-based learning – **content** areas

Thus the different tools within Blackboard can be seen as supporting various appropriate educational functions, and that these should ideally be used in concert to maximise breadth and depth of learning. This analysis omits assessment tools, however, which is odd considering the prominent role this plays in the learning process.

Another way to analyse student activities is the 'DISC' approach (Coomey & Stephenson, 2001), which identifies four features or outcomes of effective online learning:

- **Dialogue** – the structuring of online dialogue and discussion into a course in ways that encourage and enhance learning.

- **Involvement** – of students in structured tasks, engagement with the subject matter, collaborative work, used in a course to enhance learning.

- **Support** – effective structures for instructor/tutor/peer feedback, online support and feedback that enable students to make more effective use of the VLE.

- **Control** – by learners of their learning in key activities on a course, and the extent to which they are encouraged to exercise that control.

In order to answer Research Question 2, these categories and issues were used to analyse the learning paradigm(s) implicit in the way teachers described using Blackboard. Collis & Moonen's (2001) distinction between online courses in which the learner is simply intended to *acquire* knowledge, and those in which they are intended to create knowledge through *participation* is also useful, in that it illuminates underlying educational paradigms.

2.14 Chapter summary

The Web has become a rich environment in which to design and support learning activities. This is thanks to the development of sophisticated tools for publishing information, student administration, file exchange, communication and collaboration online. Two main types are of interest to the current study:

- Virtual Learning Environments (VLEs) providing various content, communication and assessment tools online in one place for a course;
- Institutional 'portals' benefiting from recent technical developments that have enabled the creation of 'service-oriented architectures' (SOA), providing a host of tailored information, tools and services to specific authenticated users.

The latter has led to university portal sites able to integrate various functions for staff and students and enable them to be viewed and manipulated online (updating address details, viewing student or financial records). At the interface between the functions of a VLE and a portal lie Managed Learning Environments (MLE) – essentially portals with a teaching and learning function. These interlaced levels of technology are important to the interpretation of staff perceptions of the place and function of a VLE within the institution as a whole.

The literature review has covered a broad range of technical developments and theoretical approaches relevant to the analysis of VLE systems. It started by describing how the Web has evolved into its current level of sophistication so that the functionality of VLEs could be discussed. After describing the Blackboard system, research into VLEs and CMC was presented, and the expectations of both learners and staff in relation to such systems discussed. The theoretical approaches most likely to provide insight into the use and perceptions of a VLE were explained, with socio-cultural approaches capable of organisation-level interpretations being most favoured.

In relation to the VLE itself, organisational and human issues are likely to be important in determining the nature of use. Based on findings from the literature, the study was informed by the following **analytical framework**:

- Use in the areas of **content** (upload of teaching materials), **communication** (discussion boards, email and other tools) and **assessment**. Other uses of the VLE were categorised using terms applicable to the usage data generated from Blackboard and include **administration**, **student** areas and **group** areas.

- Perceptions of use relating to four levels of activity: issues relating to **technology**, **pedagogy**, **implementation** and the **institution** (Collis & Moonen, 2001).

- The extent to which students were encouraged to **acquire** knowledge and/or **participate** in collaborative learning (Collis & Moonen, 2001).

- Learning activities as described by staff and whether these related to the categories: **dialogue**, **involvement**, **support** or **control** (Coomey & Stephenson, 2001).

- Successful implementation and use of a VLE is as much (perhaps more) dependent on social as technological factors. Socio-cultural and sociological interpretations are therefore valuable in understanding processes involved in implementation.

Chapter 3: Research Methodology

This chapter details the strategy adopted to answer the research questions, which are:

1 In what ways do staff expect that VLEs will support learning, teaching and assessment?

2 How do these expectations relate to explicit/implicit views of the learning and teaching process?

3 In what ways are the above expectations congruent/incongruent with the capabilities of the VLE being implemented?

4 How is the VLE being used by staff?

5 What recommendations can be made for further development of VLEs?

3.1 Research Strategy

The study involved a mixture of quantitative and qualitative methodologies. As the study was centred on *issues and perceptions* of VLE use, it operated within a naturalistic or hypothesis-generating paradigm rather than a hypothesis-testing one. The research has been informed by work on affordances and by socio-cultural and sociological perspectives (see 2.10, 2.11, 2.12). An analytical framework was formulated to aid in the structuring and interpretation of results (see 2.13). The research is approached from a perspective which assumes that the use of the VLE, and the perceptions of staff using it, are embedded in, and influenced by, an evolving social context with certain rules, norms and expectations (2.12).

The use of Blackboard (research question 4) was investigated through user statistics both as a sampling frame and backdrop to the qualitative data. User data such as this can provide rich information, especially in conjunction with other sources (Ingram, 2004). The statistics were collected in order to observe use of the Blackboard system alongside what staff said about its use. Of particular interest

was the relative use of the different tools available (content uploading, communication and assessment tools). [31] The resulting data were analysed and displayed in different ways (using descriptive statistics, summary tables, graphs and charts) to aid interpretation of usage patterns. The patterns of most interest were:

- Changes in the use of different tools over time

- Changes in use by different groups (academics/students) over time

- Seasonal patterns of use (for instance term time / vacations / across different terms)

Staff perceptions (research questions 1-3) were investigated using a focus group and 22 in-depth semi-structured qualitative interviews. [32] Qualitative data were interpreted through the development of grounded theory (Glazer & Strauss, 1967) in order to develop understandings of how online learning is perceived and used (Strauss & Corbin, 1990). In particular, the approach adopted by Miles & Huberman (1994), described in Punch (1998) as analytic induction, was used to extract meaning from the interview data. The data were read and codes (terms and short phrases describing the issue/concept discussed) were allocated to pieces of text. Concurrently with code generation, codes were also compared, combined or modified so as to best represent the themes within the data. A continual process of data reduction, data display and drawing/verifying conclusions was employed to achieve this.

- Data reduction – summarising the data using codes to describe emerging themes and perceptions of staff

- Data display – displaying the codes on screen in mutable hierarchies which could be continually modified to better represent the emerging themes

- Drawing / verifying conclusions – the meanings of data codes and the linked passages were interpreted in the light of themes emerging from the data and interpretive frameworks from the literature (see section 2.14), what Punch (1998) calls “memoing”.

Additional data were collected until the codes generated confirmed themes already discovered. The use of an external framework from the literature meant this

approach was perhaps not a pure form of grounded theory, in which one is supposed not to force preconceived ideas onto the data but let the theory emerge from the data upwards. Care was taken to avoid use of these external ideas during initial coding of raw data – reading the text 'as it was'. Only later, once initial codes had been generated, were they applied. In addition, a second reader was employed to provide an initial analysis of themes from reading the interview data. These were only looked at by the researcher after their own data analysis was complete to check whether similar themes arose (Appendix 14). Themes could be matched in 86.2% (122/130) of cases and themes occurring more often were similar to those in the study (discussion boards, "virtual filing cabinet", content storage and so on).

It was considered necessary to make use of an organising framework at the 'drawing conclusions' stage of analysis in order to create models of the data which could be interpreted in the light of, and compared with, other relevant work. The two strands of data collection were interpreted where relevant in the light of each other by making links between staff perceptions of the use of Blackboard and its use as obtained from the usage data.

3.2 Phases of the study

In order to assess any changes over time, the study has been conducted in two main phases (Figure 11). The first ("Phase 1") covers the period May 2001 to May 2002 and involved an initial Focus Group, analysis of Blackboard user statistics and 15 interviews conducted in spring/summer 2002. The second ("Phase 2") covers the period May 2002 to June 2004 and involved analysis of user statistics and a further 7 interviews (5 with people previously interviewed in Phase 1) conducted in Spring 2004 to investigate possible changes. These seven were chosen on the basis of interesting themes arising from the first set of interviews, coverage of all three staff roles (academic, strategy and support) and availability for interview.

In selecting academic staff care was taken to recruit people from different cognate disciplines who could provide an overview of more than one course as well as personal experience of using Blackboard. In the case of support staff, one had left their post and two people had taken over the support of Blackboard since the first interviews. These two new staff were added to the group to be interviewed in Spring 2004.

Author: Stephen Greenwood
Supervisor: Professor Ros Sutherland

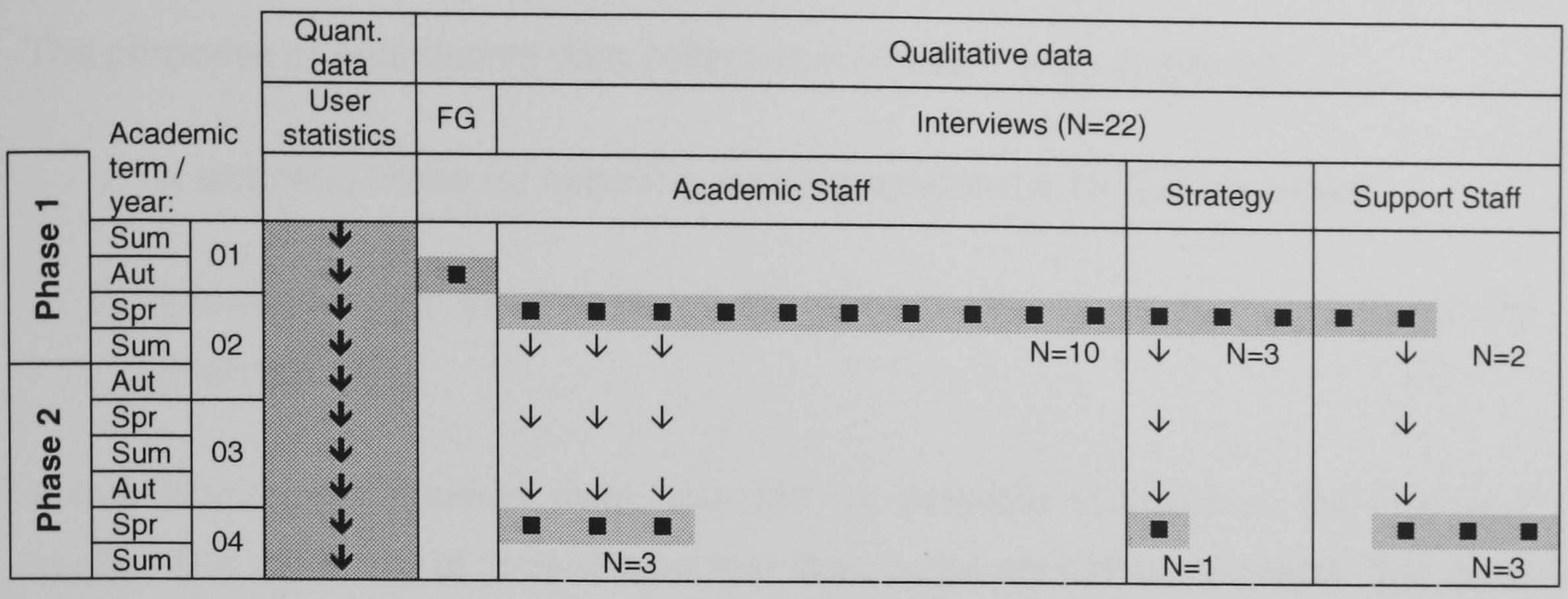


Figure 11: Data collection methods related to phases of the study (FG = Focus Group; Aut = Autumn, Sum = Summer, Spr = Spring)

3.3 Initial focus group (Phase 1)

A focus group was conducted early on to try to establish some of the main issues. The target group invited were University of Bristol staff running a course on Blackboard. This was to ensure discussion of existing use by "pioneer" users. Seven staff (6 academics and one academic related) attended the focus group. [33] Participants were asked first to describe their use of Blackboard, then to discuss this use in relation to their approach to teaching and learning and finally to look at some of the wider issues of online learning such as effective implementation. A topic guide was used by the author to provide structural prompts for this discussion (see Appendix 2). The codes and themes resulting from the text then informed the questioning strategy for the 1:1 interviews.

In addition to the 7 subjects, also present were the researcher, two members of the Learning Technology Support Service (LTSS) and a secretary. The last three people did not participate directly and were instructed not to say things and allow the researcher only to guide the discussion. The LTSS personnel made notes on a flipchart to assist the discussion and the secretary took notes of the discussions to aid with accurate transcription of the tapes. The focus group was taped and transcribed.

3.4 Usage statistics (Phase 1)

The purposes of quantitative data collected in Phase 1 were to provide:

1. a sampling frame for selecting suitable academics for the interviews

2. information on the nature of Blackboard use to triangulate against the interview data

Active Blackboard courses were selected for possible inclusion in the Phase 1 study. The definition of 'active' was that the course should be available and have students enrolled. The 'test' courses set up for all staff to experiment with (there were 5204 in 2002) were excluded from the study since it would be impossible to study them directly within the resources available and they would provide little information on real usage.

Blackboard was searched using an administrator account. The courses listed by this process were then checked against the above criteria for inclusion, then analysed for the use made of different e-tools by students and teachers. To achieve this, user statistics during the period 19th May 2001 to 29th May 2002 were collected and analysed. [34]

All records were categorised as 'Student', 'Teacher' (Blackboard Instructor), 'Administrator' (system administrator) or 'Guest' (guest account). All names were then removed from the data to ensure anonymity. Number of accesses was calculated separately for students and staff. If an academic was responsible for a course or courses with less than 10 students, these courses were not selected for further analysis as it was not thought to produce a sufficiently large sample to be statistically stable. To assess the proportion of students accessing any one course, students with 10 or less accesses for a specific course were defined as "low access". For each course the percentage of students with 10 or less accesses and with zero accesses was calculated. These figures were used in the analysis of course activity.

Blackboard provides user statistics per course for each of four main e-tool "areas": Content, Communication, Group and Student areas (see Appendix 3). This information was then used to inform the selection of academics for interview. Courses in which interesting patterns of usage were seen were selected based on

the percentage of accesses in the 4 areas (a course 'profile', for example: Communication 15%; Content 70%; Group 10%; Student 5%).

Summary of selection factors:

1. Courses with less than 10 students were excluded unless it was the only course to display a particular profile **and** had greater than 100 student accesses in total (75th centile when comparing total accesses across all courses) and no more than 2 students who had accessed it 10 times or less.

2. Courses with high numbers of accesses and/or interesting patterns of usage of the different areas within Blackboard.

3. Representation of a range of Faculties and departments, undergraduate and postgraduate courses and where possible a range of uses (student teaching, staff development, staff administrative).

3.5 Usage statistics (Phase 2)

The purposes of quantitative data collected in Phase 2 were to provide:

1. information on the nature of Blackboard use to triangulate against the interview data

2. an overview of Blackboard activity over the entire study

By summer 2003 the volume of usage data made it impossible to download and analyse data from individual courses so permission was obtained to receive text file downloads direct from the Blackboard database. Key tables were selected with the assistance of the database support team and these were imported into a MS Access database. This was used to create an amalgamated table which was essentially an activity log showing time, date and type of accesses per course per type of user. This data was imported into SPSS (version 11.5) for final analysis. User access data were categorised in terms of user type (students, academics), type of access (content, communication, assessment...) and the date and time of accesses.

Frequencies and cross-tabulations were carried out to establish the types of activity for different groups over time.

3.6 Staff interviews (Phases 1 and 2)

In total, 22 interviews were conducted with a range of subjects from different parts of the University. Staff members were identified for interview using the following categories and criteria:

- Academic Teachers using Blackboard in an Instructor role (quotes coded as "AC", n=10 with 4 of these being re-interviewed in phase 2).

- Strategic or political role in VLE development (quotes coded as "ST", n=3 with 1 of these being re-interviewed in phase 2).

- Support or maintenance role, including staff development, research & development (quotes coded as "SS", n=4 with 2 being interviewed in phase 1 and 1 of these being re-interviewed in phase 2 and 2 interviewed in phase 2).

The Academic group were selected using the usage statistics data as a sampling frame to find teachers who were active early on in the implementation of Blackboard. The Strategic and Support groups were selected from those within the support services who had a defined role in supporting Blackboard or were directly involved in strategic planning relevant to VLEs.

3.7 Textual analysis

Transcribed text from the focus group and interviews was read and codes representing issues that related to the research questions were linked to specific quotes using qualitative analysis software (see Figure 12). These codes were later grouped hierarchically into sets of "nodes" which could be manipulated and rearranged as themes emerged from the text.

The nodes were organised (Figure 13) into seven main categories based on four 'perspectives' of flexible learning (Collis & Moonen, 2001) – technology, pedagogy, implementation and institutional issues – plus three others designed to hold issues relating to teacher/staff issues, student/user issues and policy/strategic issues. Initially, as many nodes as possible were generated in order to maximise the exploratory power of the analysis. As the project progressed, text coded in various categories were compared, sometimes combined and links made between them so as to develop the best possible understanding of the data and of grounded theories emerging from it (Sapsford & Jupp, 1996).

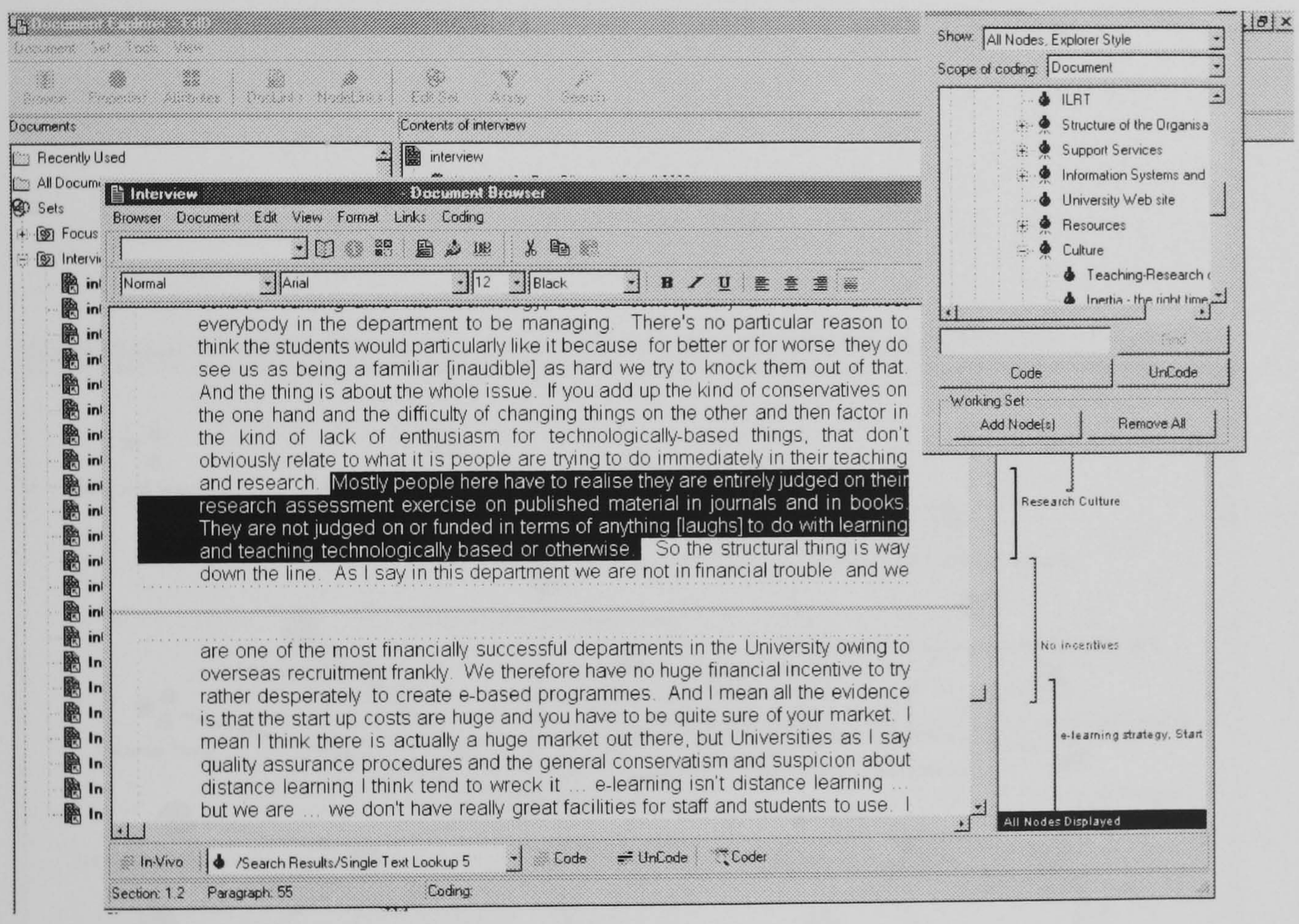


Figure 12: Coding text in N-Vivo v2

Continual adding to, reordering and re-clustering of these nodes during the analysis of transcripts enabled models to be created of the major themes arising from the study. N-Vivo facilitates this with a specific tool, the "Model Explorer", an example of which is shown as Figure 14. Each note in the model can be clicked to link direct to the coded text sections, facilitating better understanding of the data.

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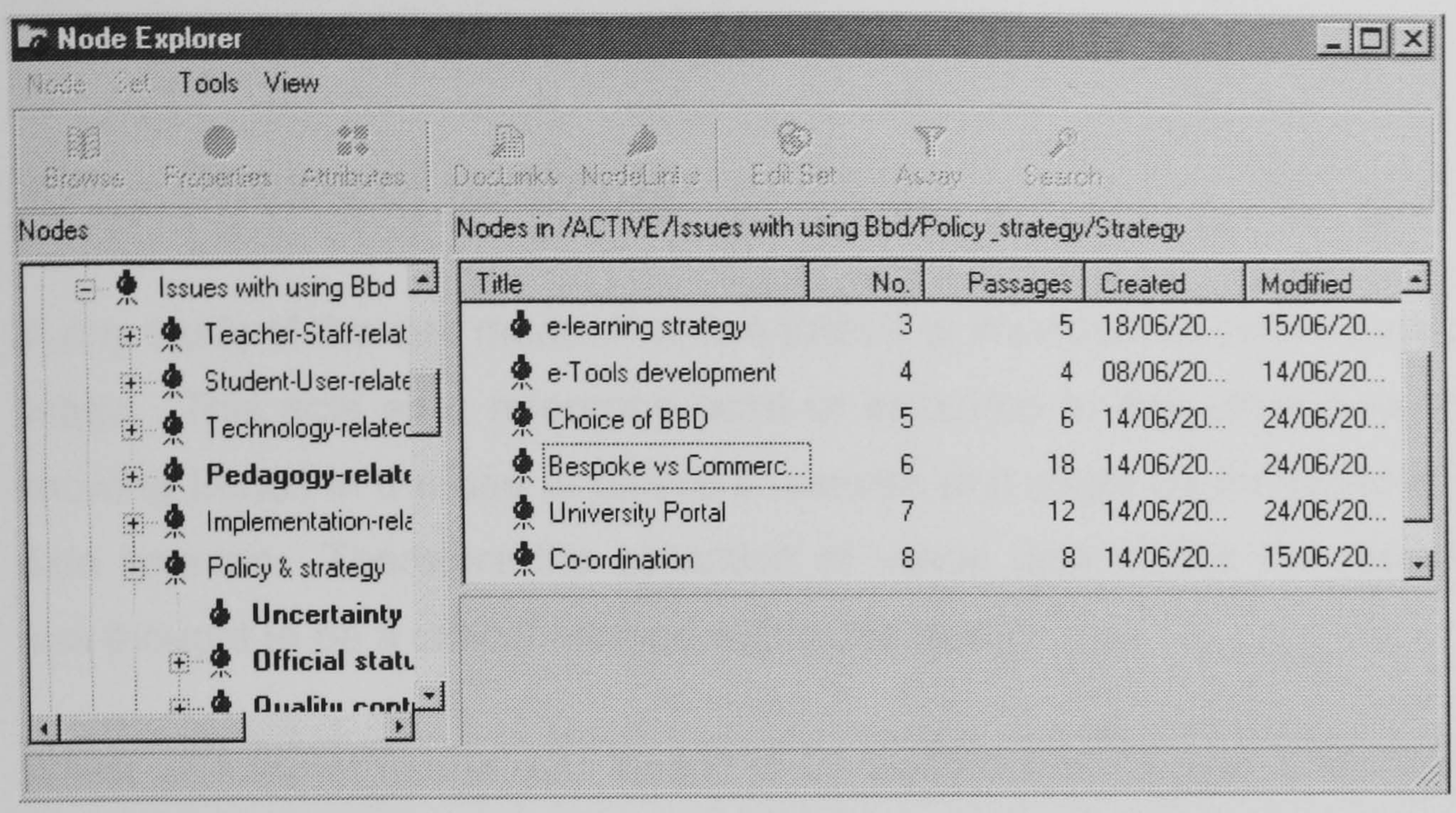

Figure 13: Organising codes in N-Vivo v2 using the Node Explorer

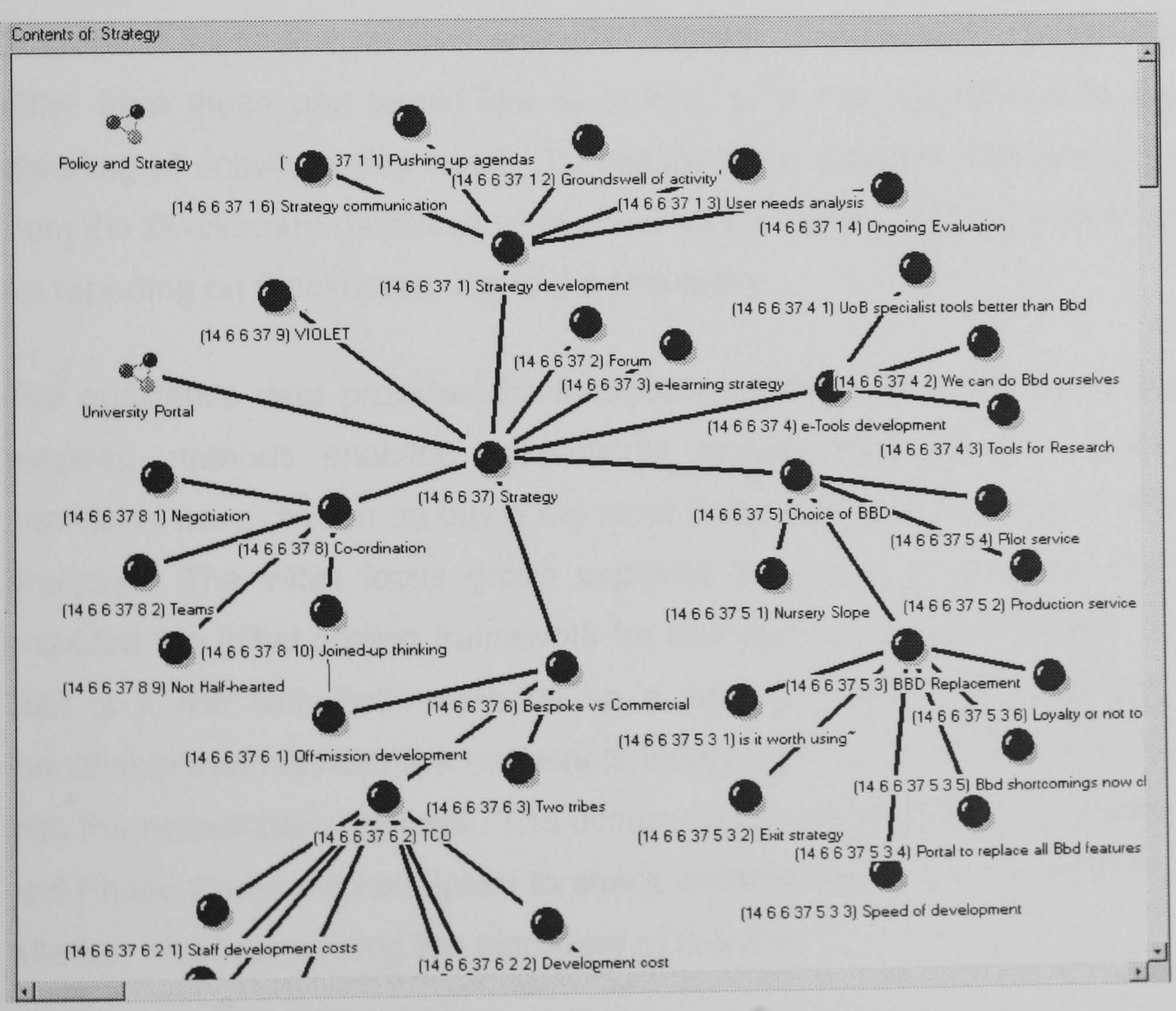

Figure 14: Model Explorer in N-Vivo

3.8 Choice of methods

In any study of the use made of online tools it is important to collect data on system usage. This acts as a reference point or backdrop to any other data collection – showing trends in the use of different features that might be triangulated with other data sources. Therefore the collection of usage data across the research period was thought to be a critical method within this study.

Whilst all Internet usage data needs to be treated with caution, it was decided that the statistics collected provided as objective a model of usage as could be obtained within the project resources. The two main issues with this data were dealt with as follows. First, recording "hits" on specific pages only indicates that a person clicked on that link and gives no indication of how long they spent on that page or what they did. This is a problem if it is intended to use the data to analyse individual histories of use but less so if the aim is to obtain a record of the popularity of the various features of the VLE, over time, as here. Second, items recorded by Blackboard may differ from those one would like to collect, or it may be difficult to interpret the meaning of activity codes used. To minimise this problem, the groupings of items from the Blackboard database were checked for validity with the person responsible for reporting on Blackboard use to the University.

The qualitative data provides the interpretive dimension of the study and as such requires methods enabling subjects to provide their views. Semi-structured interviews were chosen as being the most likely to enable this kind of collection and analysis. The initial focus group explored the range of views on the VLE and provided the initial coding framework for analysis of subsequent data. Researcher bias is a risk with both methods so a second reader was employed to report identifiable themes from the transcripts independently, so these could be compared with the researcher's themes. The occurrence of codes in the focus group, Phase 1 and Phase 2 was also analysed to check whether new codes were in fact arising or whether bias was limiting the discovery of themes.

Other methods were considered but the above were selected on the basis that they would maximise the collection of data relevant to the research questions. The use of a Dictaphone diary for academics using Blackboard was piloted but the data were found to be too inconsistent and impractical to collect. Analysis of the minutes and

recorded transcripts of some meetings relating to the support of Blackboard was also piloted but it was decided that it would be difficult to establish an appropriate sampling frame for the selection of valid meetings, and the range of meetings relevant to the research themes would be too large. Focus groups with students were considered but not carried out so as to concentrate the relatively limited time available on obtaining adequate data on staff perceptions (rather than inadequate data from a range of groups).

3.9 Theoretical distinctions between expectations and perceptions

The study title and methods talk about staff "perceptions" whilst the research questions use the term "expectations". This requires some explanation here. For the purposes of this study it is assumed that expectations are what someone anticipates the VLE will be able to do *for them* or what they will be able to do *with it* (functions and tools). Perceptions is used in the broader sense of peoples' views on what the VLE is like and for ("is it useful?", "do I find it attractive?", "what is a VLE generally for?", "what is it's place alongside the university's other activities?"). The latter term is not explicitly mentioned in the research questions but is implied in the methodological approach, literature and analytical framework. The qualitative methods were chosen to enable both expectations and perceptions to be captured.

3.10 Ethical issues

The data used in this study do not relate to especially sensitive issues but nonetheless a proper consideration of ethical and data protection issues is always important. The quantitative and qualitative data are neither "personal data" nor "sensitive personal data" as defined by the 1998 Data Protection Act (DPA). In addition, steps have been taken to ensure that any potential ethical issues in collecting, holding, analysing or presenting the data are minimised or negated. In respect of the quantitative data, permission to obtain user statistics from the Blackboard system for research purposes was obtained from the manager of the Learning Technology Support Service. In addition, this is global data from which

courses and individuals cannot be identified and therefore need not be informed (DPA 1998 Section 33(1)), and the names were stripped from the tables used for analysis. In respect of the qualitative data, all quotations were made anonymous by use of codes and the subjects were offered the opportunity to view the transcript of their interview (DPA 1998 Section 8(2)(b)) and provided their signed consent (Appendix 4: Interview consent form) for the use of quotations before analysis was undertaken.

3.11 Chapter summary

This study has used quantitative data (usage statistics) both as a sampling frame to select for interview academics using the Blackboard system, and to investigate the use of features available on the system throughout the 3 years of the study. A focus group was conducted at the start of the project to establish key perceptions and questions for further investigation in one-to-one interviews. The interview data was used to interpret this use of Blackboard and the perceptions of staff involved with it. Interviews were undertaken at the beginning and end of the 3 year period with the same subjects where possible. Qualitative data was coded for further analysis and interpretation.

The next chapter presents the analysis of quantitative data, starting with the selection and analysis of the initial sample of courses and academics, then showing the use made of the system during the study, focussing on changes over time and the proportionate use of different features of Blackboard.

Chapter 4: Quantitative Results and Analysis

This chapter begins with a description of how quantitative data were used in choosing an initial sample of Blackboard courses and to select individual academics for the interviews. The remainder of the chapter presents the usage statistics gathered in Phase 2, showing the development in use across the three years of the study.

4.1 Analysis for selection of Blackboard courses for the study (Phase 1)

Searching the Blackboard system returned a list of 190 available courses (May 2002). From these (using the criteria described in section 3.4), 95 were selected as being suitable for further investigation and for generating a sampling frame for the interviews (Figure 15). [35]

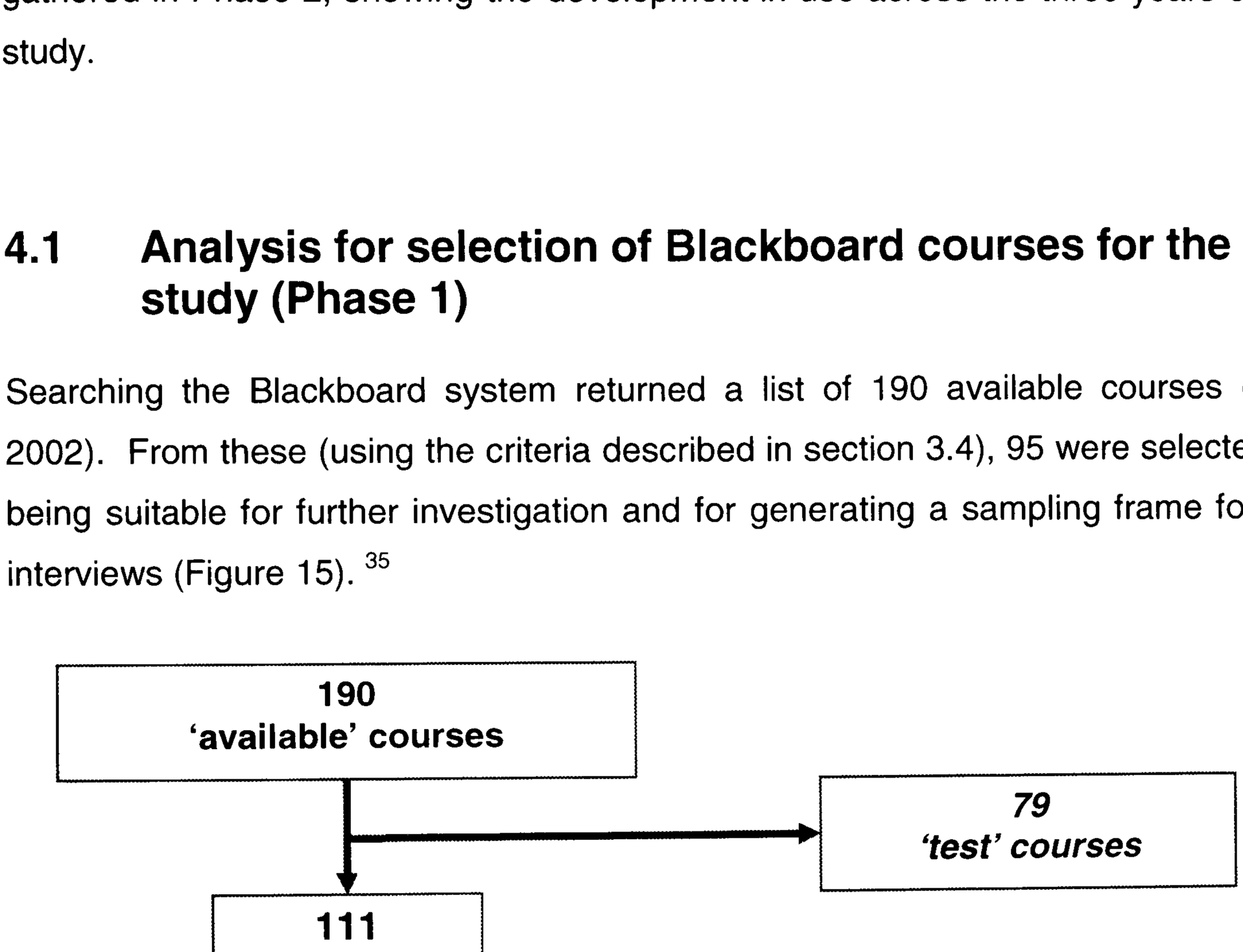

Figure 15: Selection of courses for quantitative analyses (Phase 1)

This sample contained a range of subject disciplines, audiences and numbers enrolled (Table 3, Table 4 and Figure 16 below). When a system is first made available a broad spread is likely before there has been time for a stable pattern to emerge. Later analysis of equivalent Phase 2 data showed a similar distribution with wider spread (mean number of students enrolled = 58.63, stdev = 77.84 over 785 courses). One might expect both these statistics to increase over time but not necessarily to conform to a normal distribution. Numbers enrolled will be contingent on the purpose of each course and routine class sizes in various subjects.

Table 3: Descriptive statistics for the Blackboard courses surveyed (n=95)

	Students enrolled	Academics enrolled	All enrolments
Total enrolled (95 courses)	4432	294	4726
Minimum number enrolled on any course	1	1	1
Maximum number enrolled on any course	294	12	302
Median number enrolled on any course	19	2	20
Mean number enrolled on any course	46.17	2.65	42.58
Standard deviation of this mean	62.64	2.33	60.89

All courses made use of some content upload. The use of other e-tools on these courses was observed in order to inform questions for the interviews.

- **Discussion Boards**: 31 courses (33%, n=95) had at least one discussion 'forum' established. Of these, 25 (81%, 26% of total) had active forums (containing messages from students).

- **Group Pages**: only 17 courses (18%, n=95) contained Group sections for student subgroups, suggesting that most teachers found the main Discussion Board and other tools adequate and/or their courses were not large enough or appropriate for supporting subgroups.

- **Assessment tools**: 44 courses (46%, n=95) had between one and over 20 assessment quizzes or surveys present. Of these, 6 (14%, n=44) had the "Check Grade" item disabled, suggesting some tutors prefer to hide marks for later disclosure.

A significant minority (between 11% and 17%, n=95) of courses had the following features disabled: Virtual Classroom, Check Grade, Electronic Blackboard, Blackboard online Manual, Tasks, Roster (view a list of users). Triangulation with interview data suggests this is due to a desire to reduce the number of options from which students have to choose and/or they cannot see a use for them in the current academic session.

Similarly, the options chosen for navigation buttons were usually the default ones (for between 82% and 96% of courses, n=95). Where courses did display variations on these, this was related to the aims and nature of the course. For instance, courses only established to administer an online quiz would be pared down to the bare minimum of navigation buttons.

4.2 Quantitative data as a basis for the Interviews

Table 4 shows the numbers of Blackboard courses represented in the interview data, alongside the academics' subject areas and target audiences for the courses (Undergraduate, Postgraduate, Staff). On each of these dimensions it was possible to obtain a cross-sectional sample, as seen by comparing the spread of target audiences in the interviews and all 95 selected courses in Table 4 and by comparing the spread of subjects to that in Figure 16, which also includes all selected courses.

Table 4: Numbers of Blackboard courses run by academics in the interviews and focus group, categorised by the subject area of the academic and the target audience of the courses.

Interview / focus group (FG) number	Subject area	Target audiences: Undergraduate	Postgraduate	Staff	Total	
512-AC (FG)	Education		3		3	
314-AC	Education		1		1	(13%)
117-AC (FG)	Education	1			1	
118-AC (FG)	Education	1			1	
116-AC (FG)	Humanities	4			4	(9%)
308-AC	IT and Information Science		1		1	(2%)
311-AC	Languages			1	1	(2%)
310-AC	Law	17 *			17	(37%)
307-AC	Medicine (Medical Sciences)	1			1	
313-AC	Medicine (Medical Sciences)	2			2	(28%)
306-AC	Medicine	1			1	
515-AC (FG)	Medicine	8		1	9	
119-AC (FG)	Medicine	1			1	
409-AC	Politics	3			3	(7%)
	Total	23 (85%)	5 (11%)	2 (4%)	**46**	
	Representation overall in the selected active courses	73 (78%)	15 (16%)	7 (7%)	**95**	

* The Law courses were in fact copies of the same course for different tutor groups

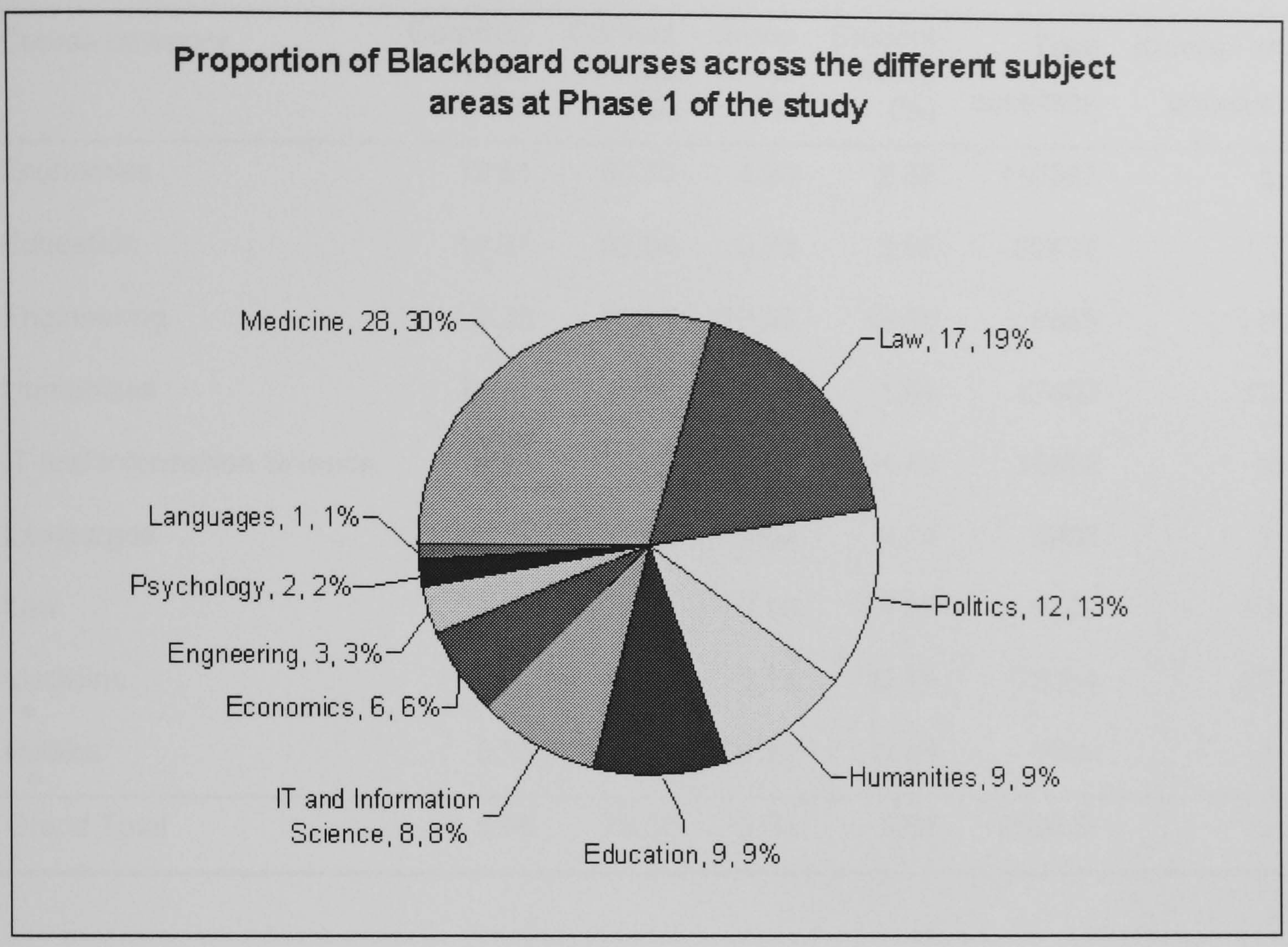

Figure 16: Spread of Blackboard courses (n=95) across different subject areas in Phase 1

The activity profile across the subject areas was calculated to see if different patterns of use were evident (Table 5). All had high use of content upload but there were some differences in the use of other tools. It was therefore important to attempt to interview people from a range of subject disciplines (as far as was practicable). All subjects apart from Economics and Engineering were sampled. Whilst these might have proved interesting in terms of group area use, it was decided that Economics had a similar profile to Education and to several other subject areas but across fewer courses, and there were very few accesses to only 3 Engineering courses at the time of sampling. More critically, the one Engineering course that met the selection criteria did not actually have the Group areas activated.

Table 5: Student usage data from Blackboard courses for different subject areas (2001-2002)

Course category	Comm'n. Areas (%)	Content Areas (%)	Group Areas (%)	Student Areas (%)	Total accesses	Number of courses
Economics	12.61	80.78	4.20	2.42	110357	5
Education	12.61	83.04	0.73	3.62	32432	11
Engineering	9.38	53.67	23.37	13.59	6355	3
Humanities	14.57	83.26	0.63	1.54	17407	12
IT and Information Science	14.25	70.25	11.03	4.46	16857	6
Languages	68.31	31.43	0.00	0.26	5803	1
Law	1.24	77.74	0.10	20.92	9729	17
Medicine	8.63	80.12	1.15	10.11	76334	27
Politics	8.76	87.62	0.17	3.44	5683	11
Grand Total	9.68	79.20	2.31	8.81	280957	93

Table 6 shows the student user statistics of Blackboard courses for which subjects in the interviews were Instructors (in most cases the main Instructor). This indicates (in part by the use of shading) the features that sparked an interest in investigating a course further. As much as possible people were selected who represented courses with a range of differing usage profiles. All courses display high usage for the Content Areas, but many courses also have high usage in other Areas.

Also shown is the percentage of students making less than 10 accesses in total ("<10 hits"), the percentage making no accesses ("0 hits") and the mean number of hits per course. These statistics were used to judge the basic popularity of courses by providing a measure of the level of engagement by students. This enabled the selection of academics for interview who had created at least one reasonably successful course. Finally, Table 7 provides some further information about the interviewees, their involvement at different phases of the study and the codes used to link their comments in the qualitative results (Chapter 5).

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Table 6: Student usage data from Blackboard courses for which subjects in the interviews were Instructors (in most cases the main Instructor)

NB: Each row represents a Blackboard course

Interview subject	Num. stud.	<10 hits	0 hits	Comm'n. Areas (%)	Content Areas (%)	Group Areas (%)	Student Areas (%)	Profile type	Mean num. hits	Sum
306-AC (Medicine)	40	78%	55%	1	84	0	16	D	7	288
307-AC (Medicine)	294	85%	72%	9	90	1	0	A	7	2004
308-AC (IT & IS)	10	30%	20%	44	47	6	3	B	75	745
409-AC (Politics)	47	45%	30%	16	82	0	2	B	26	1208
	15	13%	0%	12	84	0	3	B	61	913
	4	50%	25%	31	66	0	3	B	31	125
310-AC (Law)	81	23%	0%	2	93	0	4	A	24	1980
	17	0%	0%	1	73	0	26	D	31	527
	18	22%	0%	1	77	0	22	D	33	587
	18	17%	0%	1	77	0	21	D	48	870
	19	16%	0%	0	77	0	23	D	26	499
	14	79%	64%	0	69	0	31	D	6	82
	19	0%	0%	3	74	0	22	D	31	585
	19	11%	0%	1	79	0	19	D	38	729
	18	22%	0%	1	78	0	21	D	24	439
	21	29%	0%	2	74	0	24	D	25	532
	16	25%	0%	2	80	0	18	D	40	640
	13	23%	0%	0	74	0	26	D	37	476
	17	18%	0%	2	77	0	21	D	32	542
	18	17%	0%	1	71	0	28	D	28	500
	18	22%	0%	3	73	0	24	D	40	714
311-AC (Languages)	20	15%	0%	68	31	0	0	B	290	5803
512-AC (Education)	21	5%	0%	29	68	0	2	B	348	7316
	17	12%	6%	18	76	0	5	B	467	7944
	85	39%	34%	7	87	4	2	A	193	16420
313-AC (Medicine)	177	33%	20%	31	62	0	7	B	74	13011
	20	55%	50%	51	47	0	2	B	78	1564
314-AC (Education)	12	58%	58%	48	50	1	1	B	33	395
515-AC (Medicine)	17	12%	6%	10	70	17	3	B/C	119	2022
	15	67%	67%	8	89	0	3	A	19	284
	171	71%	47%	6	90	0	3	A	7	1271
	174	74%	45%	7	68	0	25	D	8	1445
	174	57%	47%	3	94	0	2	A	21	3724
	168	94%	80%	0	92	0	8	A	2	292
	168	98%	85%	3	97	0	0	A	1	122
	5	60%	20%	2	91	7	0	A	12	58
	39	97%	97%	0	100	0	0	A	0	12
116-AC (Humanities)	4	25%	25%	1	98	0	1	A	61	242
	16	19%	19%	20	80	0	0	B	205	3283
	13	15%	15%	7	93	0	0	A	107	1394
	22	5%	0%	50	49	0	1	B	264	5818

Descriptive Statistics	Num. stud.	<10 hits	0 hits	Comm'n. Areas (%)	Content Areas (%)	Group Areas (%)	Student Areas (%)	Profile type	Mean num. hits	Sum
Max	294	98.21%	97.44%	68	100	17	31		467	16420
Min	4	0.00%	0.00%	0	31	0	0		0	12
Mean	51	37.42%	24.08%	12.31	76.38	0.99	10.32		72.68	2131.83
Median	18	25.00%	15.38%	3.06	77.15	0.16	3		32	714
Count	41	41	41	41	41	41	41		41	41

Table 7: People involved in the focus group in interviews

Code[36]	FG	Int 1	Int 2	Department	Use made of Blackboard	L
116-AC	☑			Theology	On two units – one with about 20 students, and another with 3 students – for posting materials and tasks, giving feedback and active use of discussion boards.	
117-AC	☑			Education	"… supporting students while they're on placement… interactive projects"	
118-AC	☑			ILRT	"… to support a module that I teach… part of an MSc… secondly, I work on a number of Internet services for academics and I'm very interested to think about how they might be integrated with a system like Blackboard."	
119-AC	☑			Medical School	Uses Blackboard as a VLE to support teaching on Anatomy courses in the Science Faculty and for the Medical and Veterinary Schools.	
301-SS		☑		Support Services [37]	Involved in training sessions and administration of Blackboard.	
302-ST		☑		Support Services	Managerial control of blackboard training and implementation.	
304-ST		☑		Support Services	High level strategic input to decisions regarding VLEs at the University of Bristol.	
306-AC		☑		Dentistry	Constructed a course to support undergraduate teaching for – additional content, assessment quizzes and support for students between lectures.	
307-AC		☑		Medicine	Involved with a course to move support for a physiology workbook onto the Web.	
308-AC	☑			ILRT	Set up a course to support a workshop, using discussion boards, a quiz and materials and a follow-up survey.	
310-AC	☑			Law	Set up courses for undergraduates to take a formative assessment online. Students retake the test until they reach the 90% pass mark.	
311-AC	☑			Languages	Set up as a tool for to enable collection of information on student progress from academics, via several discussion boards.	
313-AC	☑			Medicine	Innovative use for a site supporting an undergraduate medicine course – actively using discussion boards, posting learning tasks, past papers and other materials.	
314-AC	☑			Education	Postgraduate student using Blackboard to provide a support mechanism for fellow students on placement.	
403-SS	☑		☑	Support Services	Involved in training sessions and administration of Blackboard.	
405-ST	☑		☑	Support Services	High level strategic input to decisions regarding VLEs at the University of Bristol.	
409-AC		☑	☑	Politics	Responsible for a number of courses on Blackboard.	
220-SS			☑	Support Services	Involved in training sessions and administration of Blackboard.	
221-SS			☑	Support Services	Involved in training sessions and administration of Blackboard.	
512-AC	☑	☑	☑	Education	Set up three courses to support postgraduate learners at a distance (some international).	
515-AC	☑	☑	☑	Medicine	Responsible for several undergraduate medicine and science courses.	

AC = Academic staff; SS = Support Staff, ST = Staff with Strategic focus

4.3 Usage statistics

Blackboard produces statistics for Instructors to view via the control panel for that course, both on screen and as exportable files. These files are in comma separated variable ('.csv') format and are readable by Excel but display the results as eight different tables, sequentially and all in the one file. This makes analysis across more than one course quite complicated, involving many cut and paste actions or the creation of specific programmes to parse the information.

4.3.1 Usage of Blackboard over time

Accesses per student per day were aggregated to produce charts showing overall usage during the first year of the site's operation. It can be seen (**Error! Reference source not found.**) that usage increased dramatically over this period. Most activity is focussed during term time, but there has also been a steady increase in vacation usage. Vacation usage shows a "U"-shaped pattern, with accesses being greater at the beginning and end of the vacation periods. This was also seen in the Phase 2 data (Figure 27).

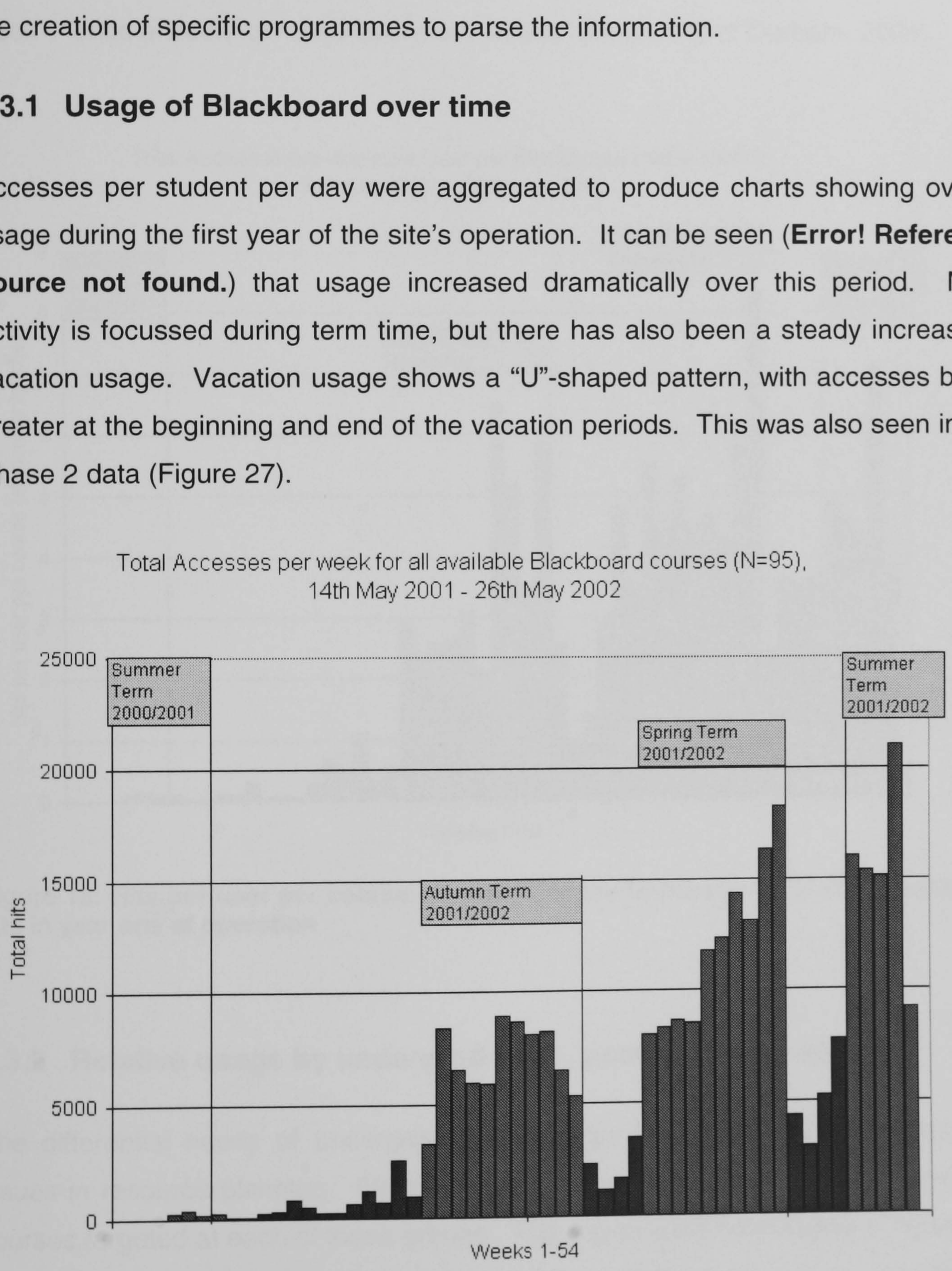

Figure 17: Total hits for the University of Bristol Blackboard site in year one of operation

The data above was manipulated to produce the **average number of hits per user per course per week**, to get a potentially more accurate picture of usage (**Error! Reference source not found.**). A very similar picture emerges except for a sudden rise in numbers during the last four weeks of the Autumn Term 2001/2002 (starting 19/11/2001). In Spring and Summer Terms 2001/2002, there were, on average, 5 hits per user per course per week. This matches data from the Durham study, where 90.5% of students claimed to be accessing Blackboard "several times a week", "once a week" or "once every few weeks" (University of Durham, 2004).

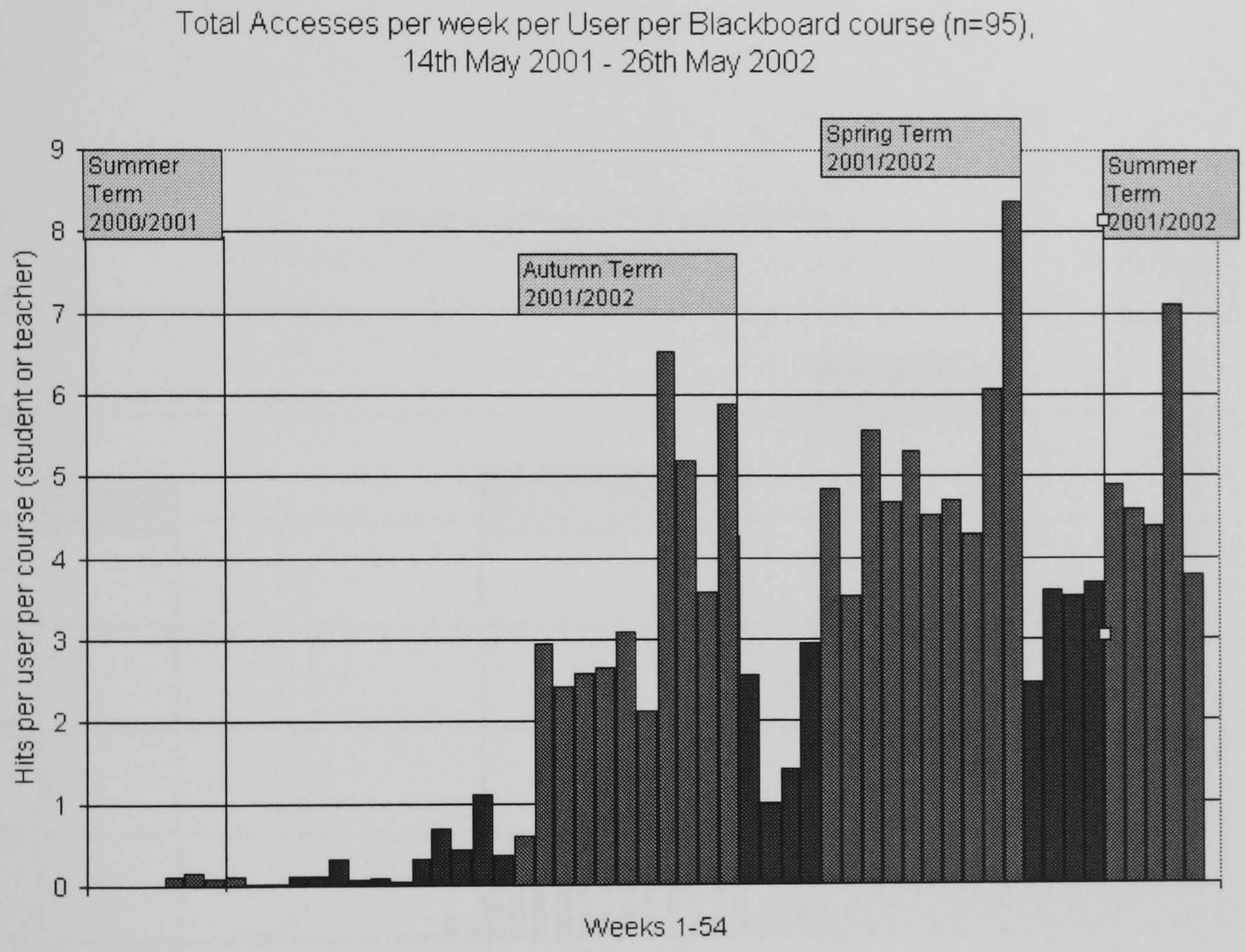

Figure 18: Hits per user per course per week for the University of Bristol Blackboard site in year one of operation

4.3.2 Relative usage by undergraduates, postgraduates and staff

The differential needs of undergraduates, postgraduates and staff are important issues in resource planning. Figures were therefore calculated for the Blackboard courses targeted at each of these groups. The usage over the first year of operation is shown, as hits per week per course, in **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.**. It can be seen that the steepest growth in usage was for undergraduate courses,

which doubled between term 1 and term 3 of the 2001-2002 session. Postgraduate usage peaked in the Autumn then subsided. The number included is small so it is difficult to speculate why this should be, except that the bulk (71%) of this activity was made up of three School of Education courses from the same tutor. Each would presumably have had similar demands and constraints on when they would be used. Staff courses showed no discernable usage pattern. This is not necessarily to be expected since there were only 7 courses. Staff courses will not follow any regular pattern, being scheduled at irregular times when there is demand. The bulk of staff course activity was made up of a course used by staff to monitor student progress (31%) and courses to support staff development workshops (64%).

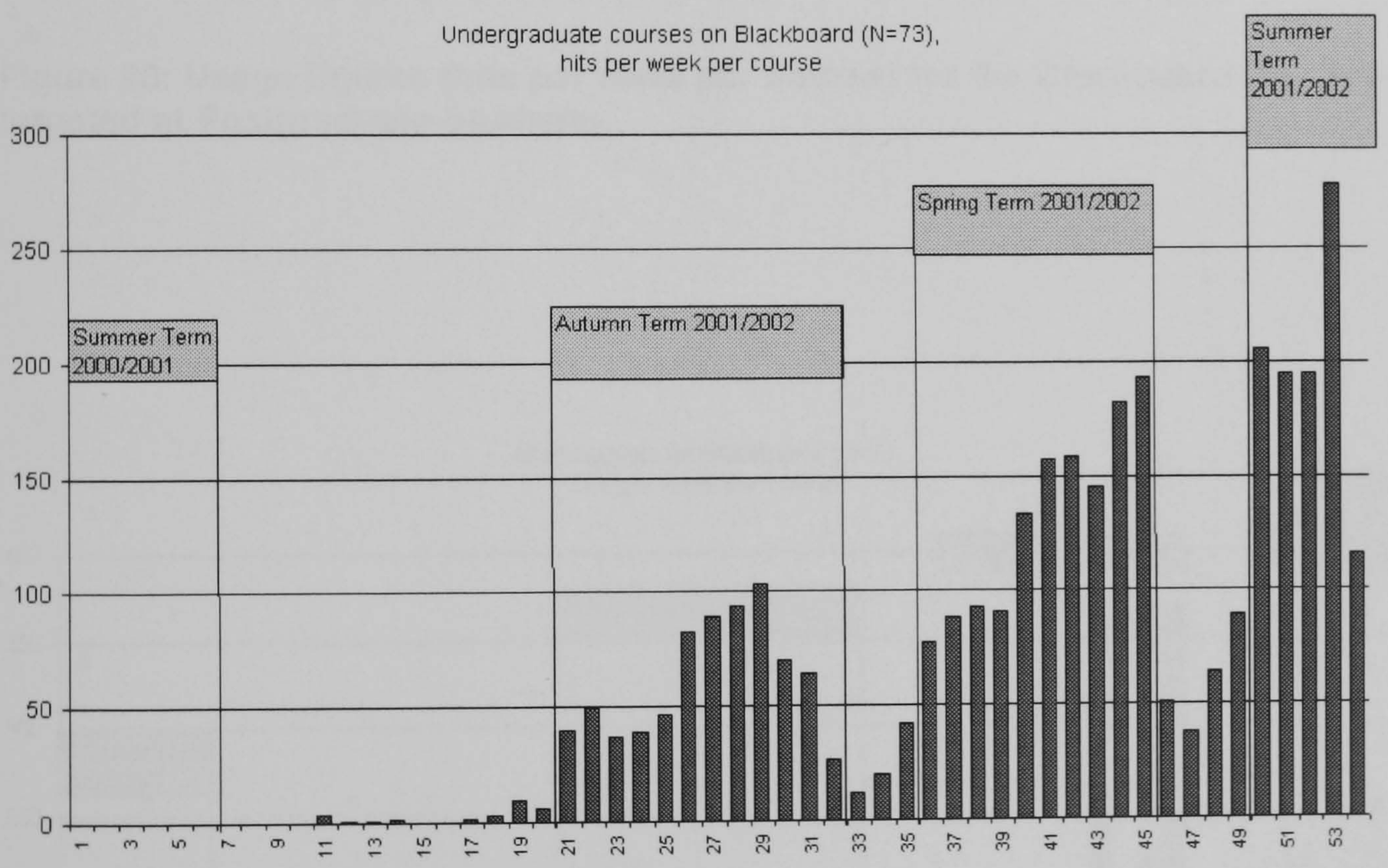

Figure 19: Usage figures (hits per week per course) for the Blackboard courses (N=73) targeted at Undergraduate students.

Author: Stephen Greenwood
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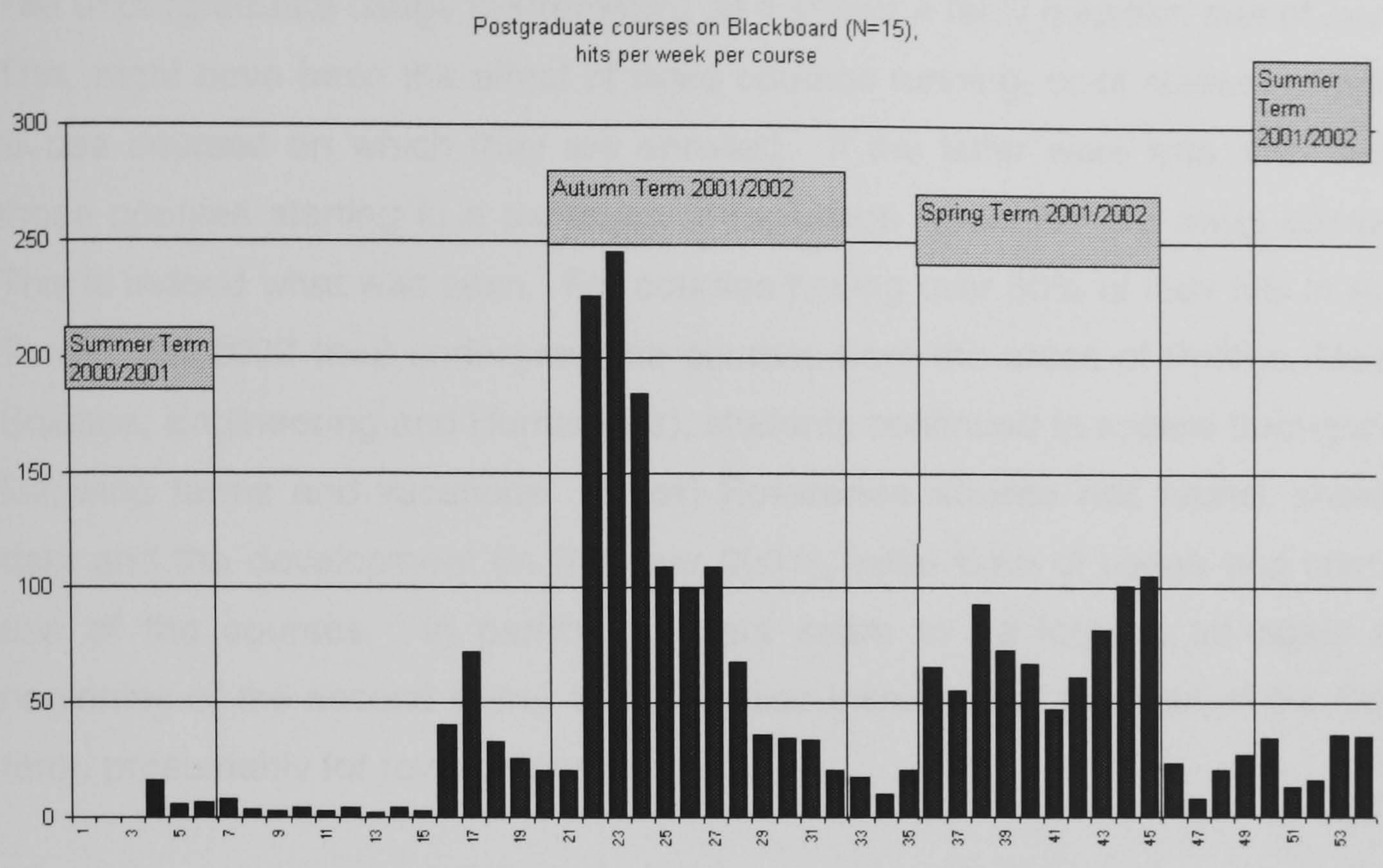

Figure 20: Usage figures (hits per week per course) for the Blackboard courses (N=15) targeted at Postgraduate Students.

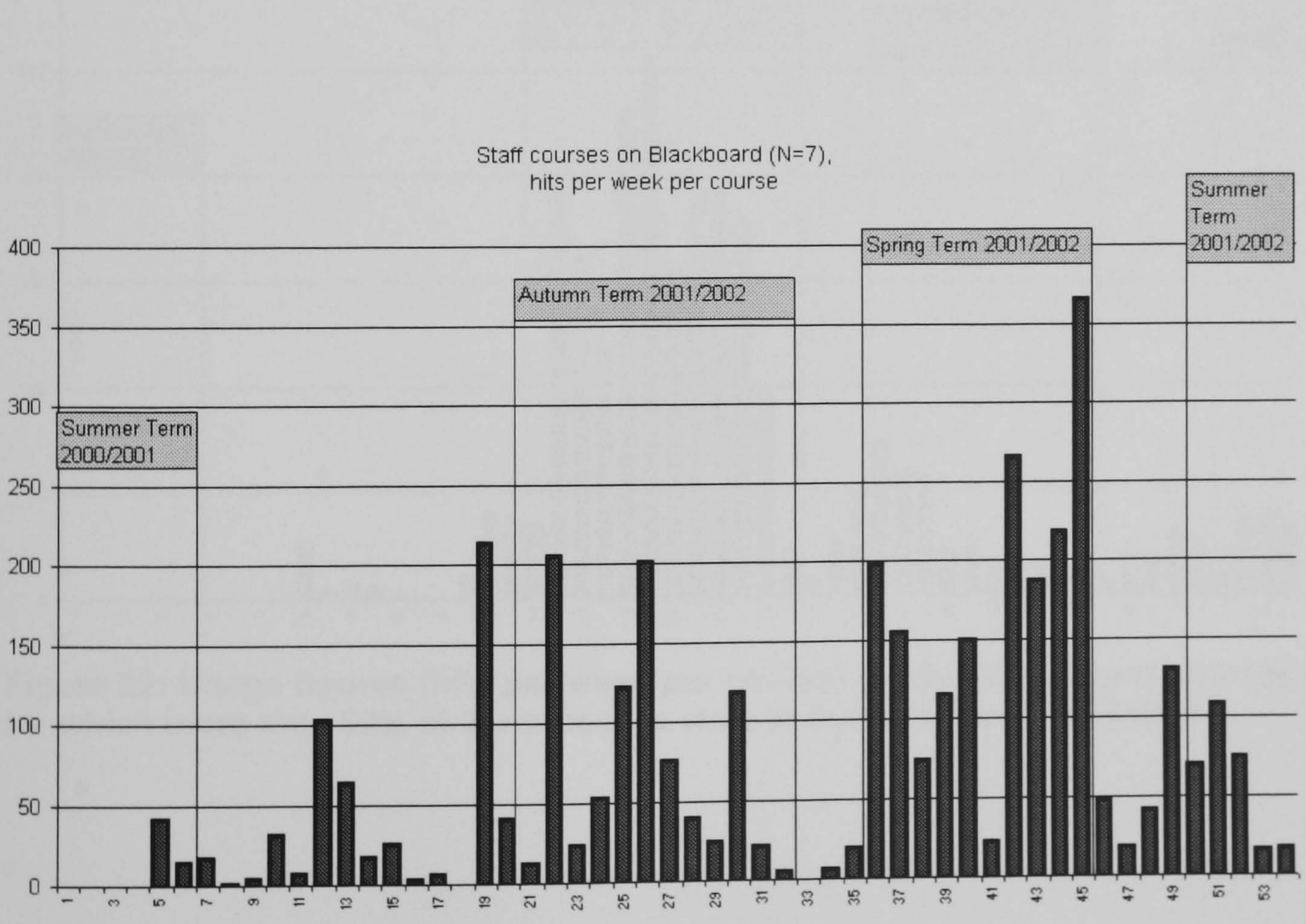

Figure 21: Usage figures (hits per week per course) for the Blackboard courses (N=7) targeted at Staff.

The undergraduate usage is interesting as it shows a fairly constant rate of increase. This might have been the effect of more courses running, or of students continuing to use courses on which they are enrolled. If the latter were true, then isolating those courses starting in a particular term, usage would not die away completely. This is indeed what was seen. For courses having over 50% of their hits in Autumn Term 2001/2002 (n=8 undergraduate courses from the areas of Politics, Medicine, Science, Engineering and Humanities), students continued to access throughout the following terms and vacations. **Error! Reference source not found.** shows this data and the development (in Summer 2001), initial flush of usage and continuing use of the courses. In particular, users seem to be logging on again at the beginning of the second term. Usage is also increased at the start of the Summer term, presumably for revision purposes.

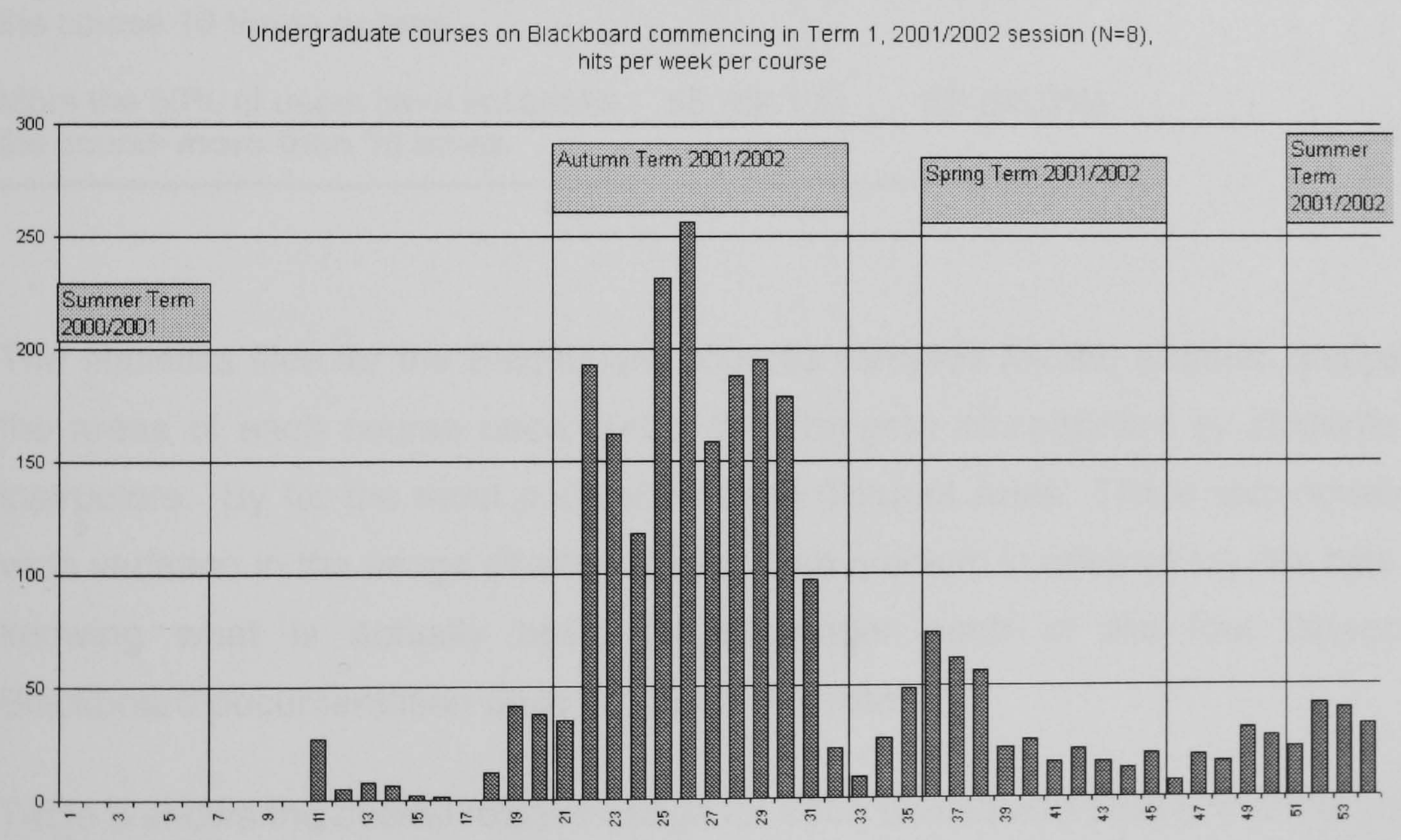

Figure 22: Usage figures (hits per week per course) for the Blackboard courses (N=8) for which more than 50% of the accesses were in Autumn Term 2001/2002.

4.3.3 Usage of Blackboard courses

Table 8 indicates user uptake of Blackboard by showing the number of active Blackboard courses on which a majority (over 50%) of users had never accessed the course or had only accessed it 10 times or less. In fact 28% of courses had a

majority of enrolled students not accessing them, but there were 55 courses (59.1%) for which the majority of students have accessed the course more than 10 times. The high proportion of courses where the majority of Instructors are not regularly accessing their courses (51, 53.6%) could be explained by the fact that 60% of courses in the sample had more than one Instructor (between 2 and 10 Instructors). It would seem reasonable to assume that only one Instructor would make the majority of changes and accesses to the course.

Table 8: Students not accessing courses

Numbers of Blackboard courses for which:	Students (n=93 courses)	Instructors (n=95 courses)
More than 50% of users have **never** accessed the course	26 (28.0%)	18 (18.9%)
More than 50% of users have accessed the course **10 times or less**	38 (40.9%)	33 (34.7%)
More the 50% of users have accessed the course **more than 10 times**	55 (59.1%)	62 (65.3%)

The statistics files for the Blackboard courses sampled (N=95) enabled analysis of the areas of each course used during the first year of operation by students and instructors. By far the most popular was the Content Area. There was however a wide variation in the usage of other areas. One problem in interpreting this data was knowing what is actually being logged under each of the four categories. Blackboard documentation does not make this clear.

Table 9 shows the overall relative usage for each Blackboard area in the first year of operation for the sample of Blackboard courses (n=95, Students and Instructors are shown separately). While Content Areas (uploading and downloading files) are by far the most popular overall (mean=80.26%), there is a range of usage Specifically, some display very high usage of Communication Areas (up to 87.85%) or Group Areas (up to 70.49%). It was therefore over-simplistic to assume that Blackboard/VLEs were only being used as a 'virtual filing cabinet' since communication and other tools represented a significant application for a number of courses. There was some doubt, however, as to whether the Group Discussion Board activities during 2001/2 have been measured under the Group or Communication Area – this changed in the upgrade to Blackboard 5.5.

Table 9: Which areas are being used most and least?

	Averaged percent of total usage				
	Accessed by students	Accessed by academics	**Overall**	Max%	Min%
Communication Areas	11.29%	12.08%	**11.35%**	87.85%	0%
Content Areas	79.97%	83.88%	**80.26%**	100.0%	12.11%
Group Areas	1.74%	2.50%	**1.80%**	70.49%	0%
Student Areas	7.00%	1.54%	**6.59%**	30.63%	0%

(Timeframe: 14th May 2001 - 29th May 2002)

4.4 Phase 2: Quantitative data

Obtaining access to data direct from the Blackboard database during Phase 2 enabled a rich and more systematic study of usage data across three academic years. It has been particularly interesting to link this data to issues arising from the qualitative interviews.

4.4.1 Change over time

The most striking thing about the usage is the dramatic increase in use between years one and two[38] shown in Figure 23 (14.8 times increase in total accesses, Table 10). It is 4.2 times higher for academics (course "Instructors") but 34.6 times higher for students. This might be explained by the simple fact that every course has one or a few instructors but many students (during Phase 2 there was average of 58.63 students per course see section 4.1). Note, however, that there was a drop in student use in year three (70,000 to 50,000 hits, Figure 23).

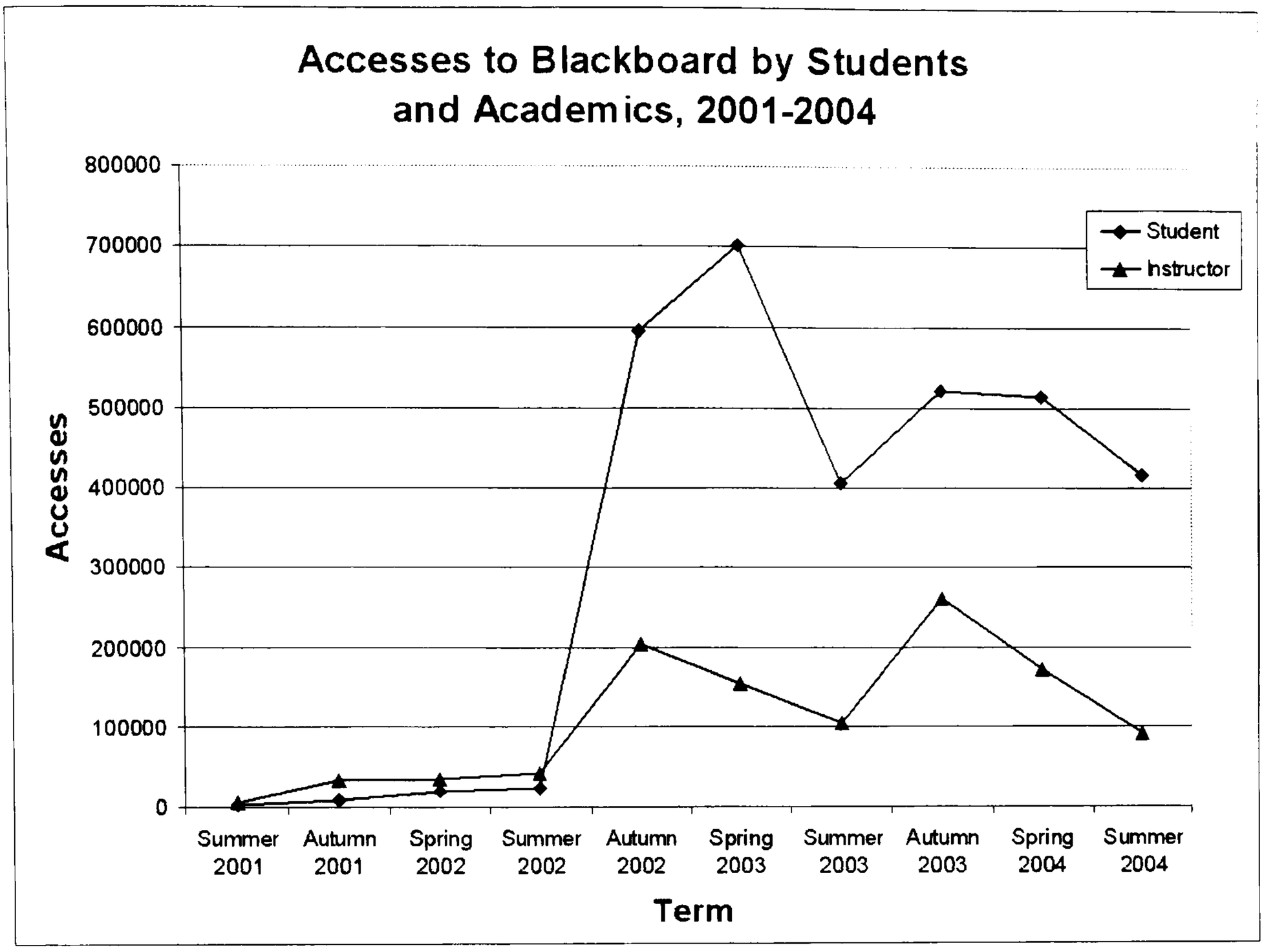

Figure 23: Accesses to Blackboard by Students and Academics per term showing dramatic increase during the 2002/03 academic session.

4.4.2 Proportions for different types of access

The relative access to each type of tool is shown in Table 10. Access to content peaks in year 2 then drops slightly in year 3, whereas access to communication tools dips in year 2 then rises again in year 3. Most of the administrative use is in year 1 as might be expected for setting up courses. Assessment, Group and Student functions are a small part of the activity although assessment shows a large increase in year 3 (but still at a low proportion of the total).

The apparently high use of 'Announcements' is almost certainly due to the fact that these are always posted on the home page of each course. Anyone logging into a course cannot fail to generate hits for this function regardless of accesses to any other area. In fact if one removes the figures for announcements and administration (Table 11), the percentage accesses for Content and Communication become (71.1%) and (20.9%) respectively in 2003/04 (80.5% and 14.4% in 2002/03; 53.6% and 37.7% in 2001/02). The data imply experimentation with communication tools, then a drop in usage during the second year then an upturn in year 3. Triangulating this with the interview data suggests this is linked to a disillusionment academics

experienced in failing to facilitate effective discussions online. In a similar way, the relative proportion of assessment use increases in year 3. Interview data suggest this is related to initial reluctance to use assessment tools.

Table 10: Proportions of usage for different types of function across three years

Number (%) of accesses per year:	2001/02		2002/03		2003/04	
Content	34116	(23.5%)	1070153	(49.9%)	897983	(42.9%)
Administration	58816	(40.5%)	277937	(13.0%)	436425	(20.9%)
Announcements	22868	(15.7%)	537203	(25.0%)	394142	(18.8%)
Communication	23968	(16.5%)	191436	(8.9%)	263806	(12.6%)
Group	2204	(1.5%)	31150	(1.5%)	41365	(2.0%)
Assessment	416	(0.3%)	5113	(0.2%)	30550	(1.5%)
Student	2915	(2.0%)	31815	(1.5%)	28458	(1.4%)
Total	145303		2144807		2092729	
			(14.8 times 2001/2 level)		(14.4 times 2001/2 level)	

Functions with higher proportions of accesses (over 10%) are shaded

Table 11: Proportions of usage for different types of function across three years – with Administration and Announcements use removed

Number (%) of accesses per year:	2001/02		2002/03		2003/04	
Content	34116	(53.6%)	1070153	(80.5%)	897983	(71.1%)
Communication	23968	(37.7%)	191436	(14.4%)	263806	(20.9%)
Group	2204	(3.5%)	31150	(2.3%)	41365	(3.3%)
Assessment	416	(0.7%)	5113	(0.4%)	30550	(2.4%)
Student	2915	(4.6%)	31815	(2.4%)	28458	(2.3%)
Total	63619		1329667		1262162	
			(20.9 times 2001/2 level)		(19.8 times 2001/2 level)	

Functions with higher proportions of accesses (over 10%) are shaded

The detail of this differential activity can be seen in Figure 26 for year 3. Accessing content was by far the most common use of the system, also seen year 2 (Figure 25) but not year 1 (Figure 24) where course administration was more dominant (instructors setting up and experimenting with their courses). The overall pattern of use seen in years 2 and 3 is similar, but a longer timeframe would be necessary to discover how established this pattern might become.

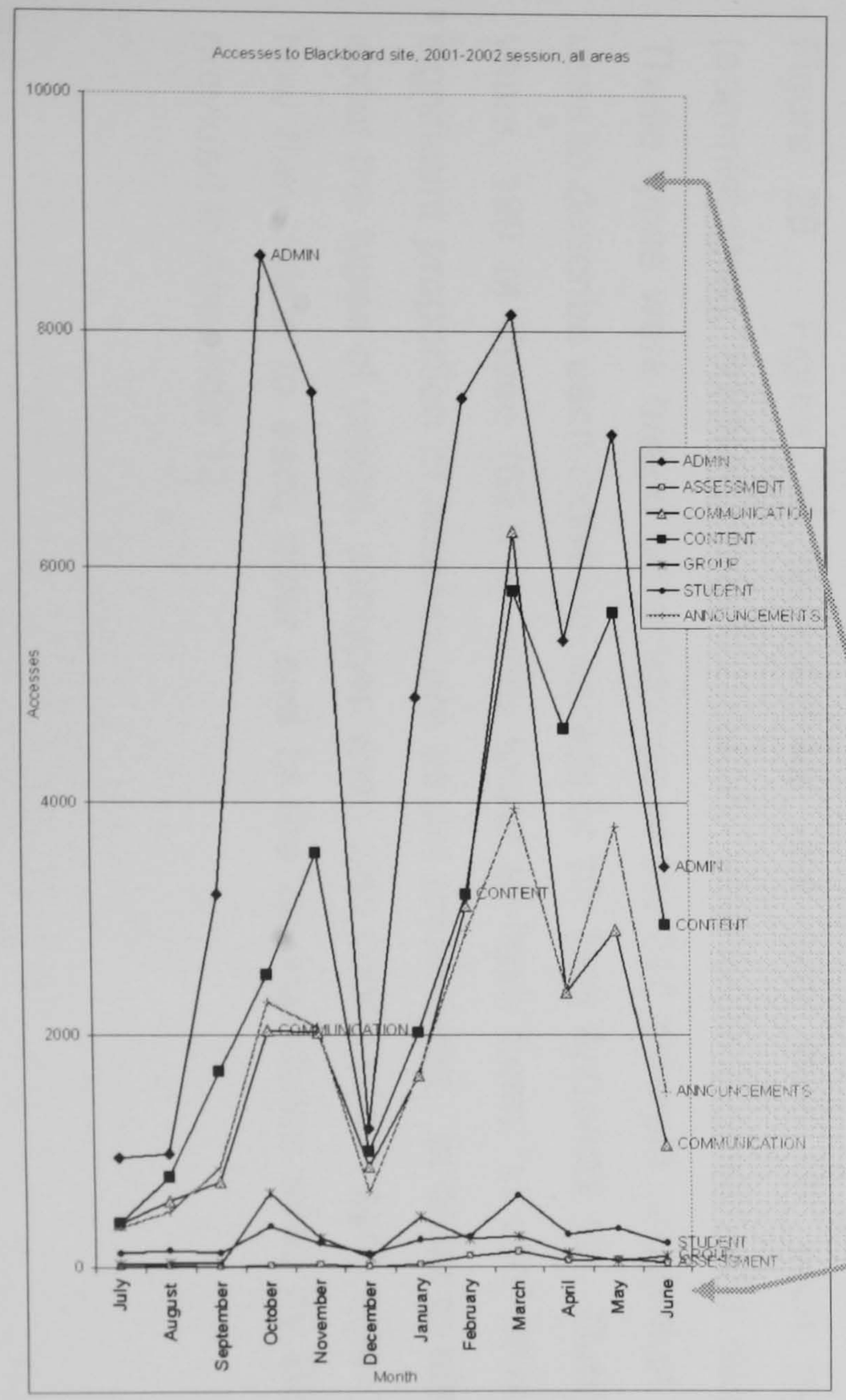

Figure 24: User statistics over a single year (2001-2002 session) for each activity type (note SMALLER SCALE: 0 to 10,000 hits)

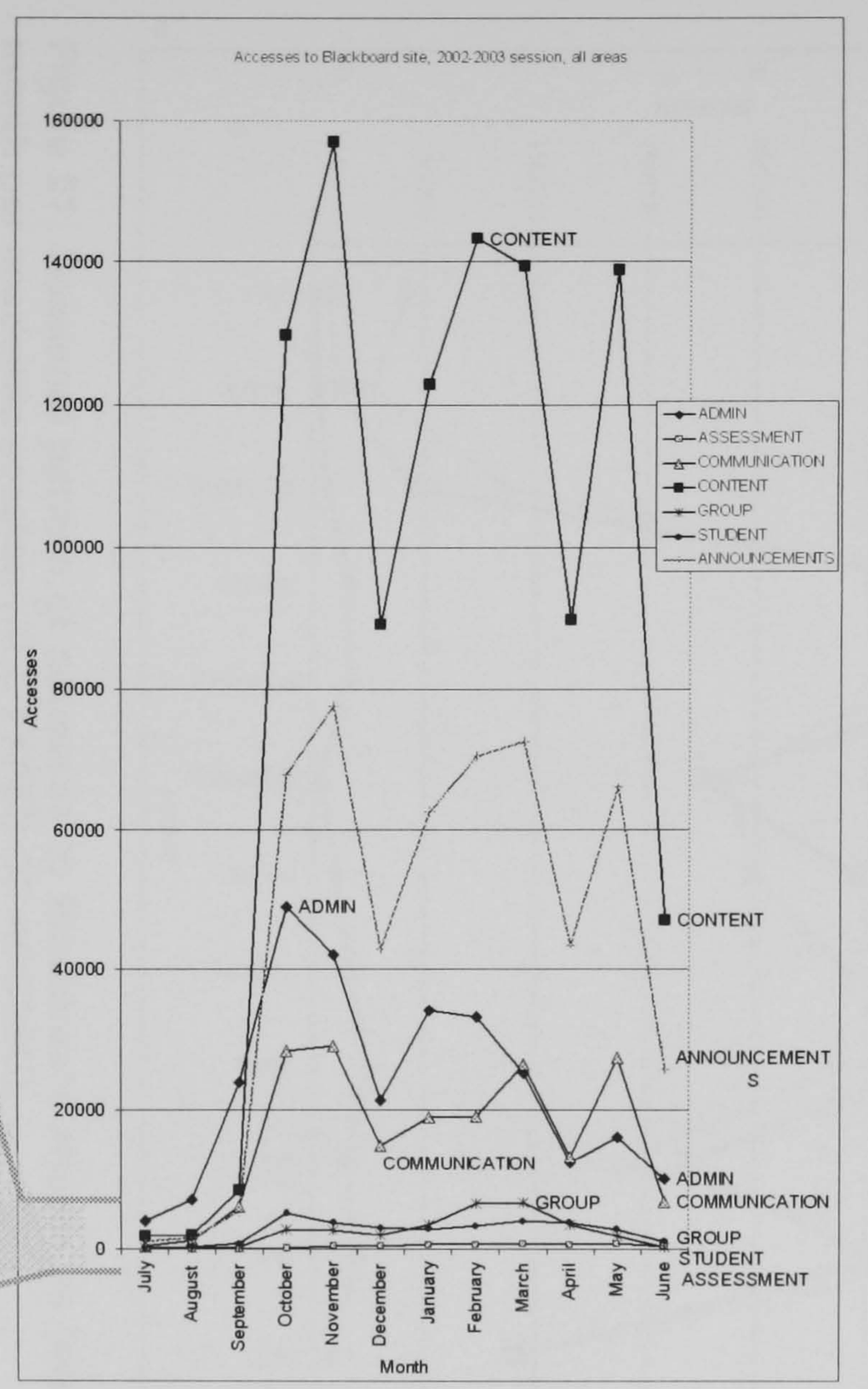

Figure 25: User statistics over a single year (2002-2003) session) for each activity type (note scale: 0 to 160,000 hits)

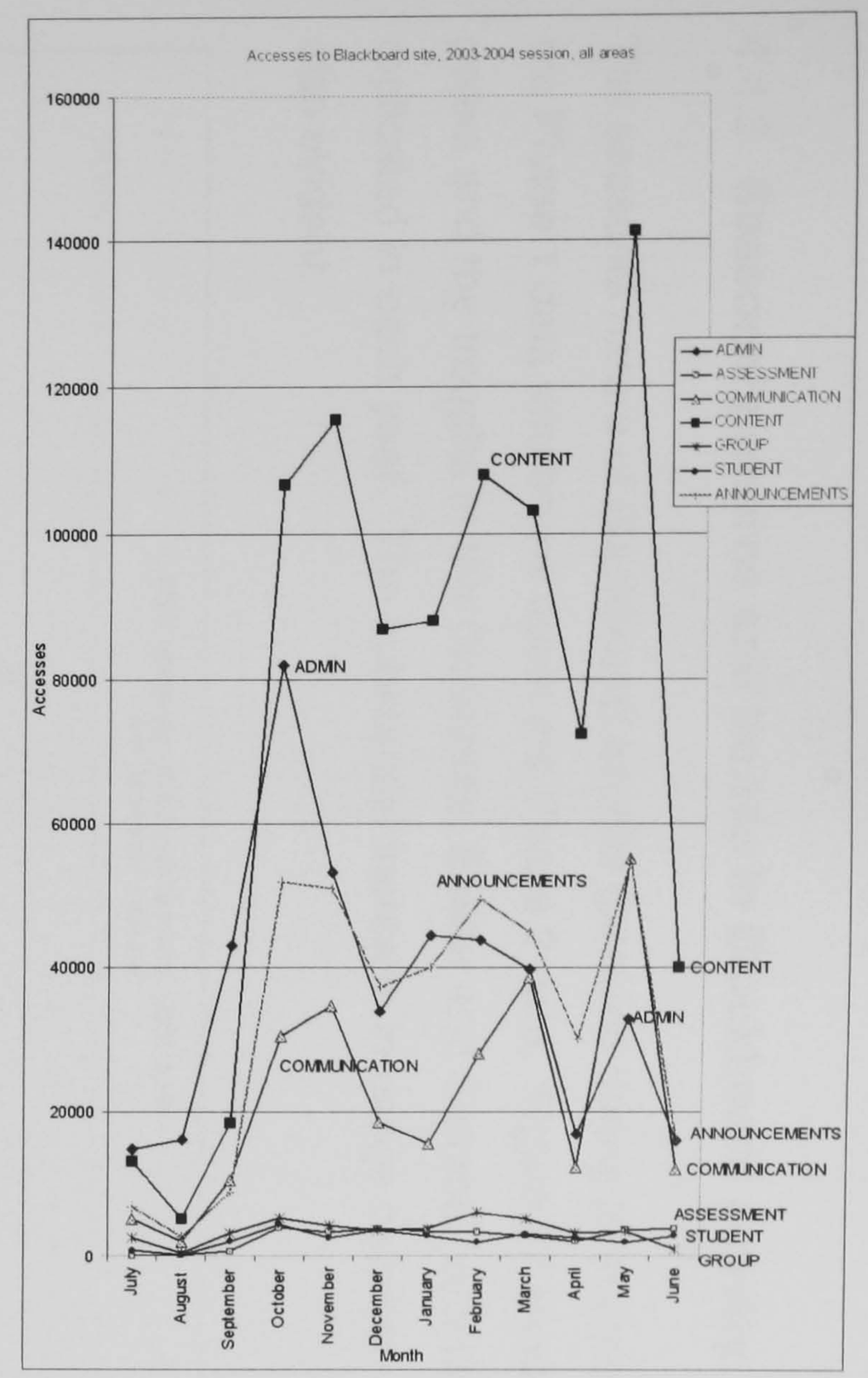

Figure 26: User statistics over a single year (2003-2004 session) for each activity type (note scale: 0 to 160,000 hits)

4.4.3 Seasonal patterns and trends in Blackboard activity

The seasonal nature of Blackboard access (peaking during term times) was noted in the Phase 1 data and borne out in the Phase 2 data. Figure 27 shows the term time peaks and the troughs in the Christmas, Easter and Summer vacations. These are replicated in each year. The substantial increase in usage between year 1 and 2 is also evident.

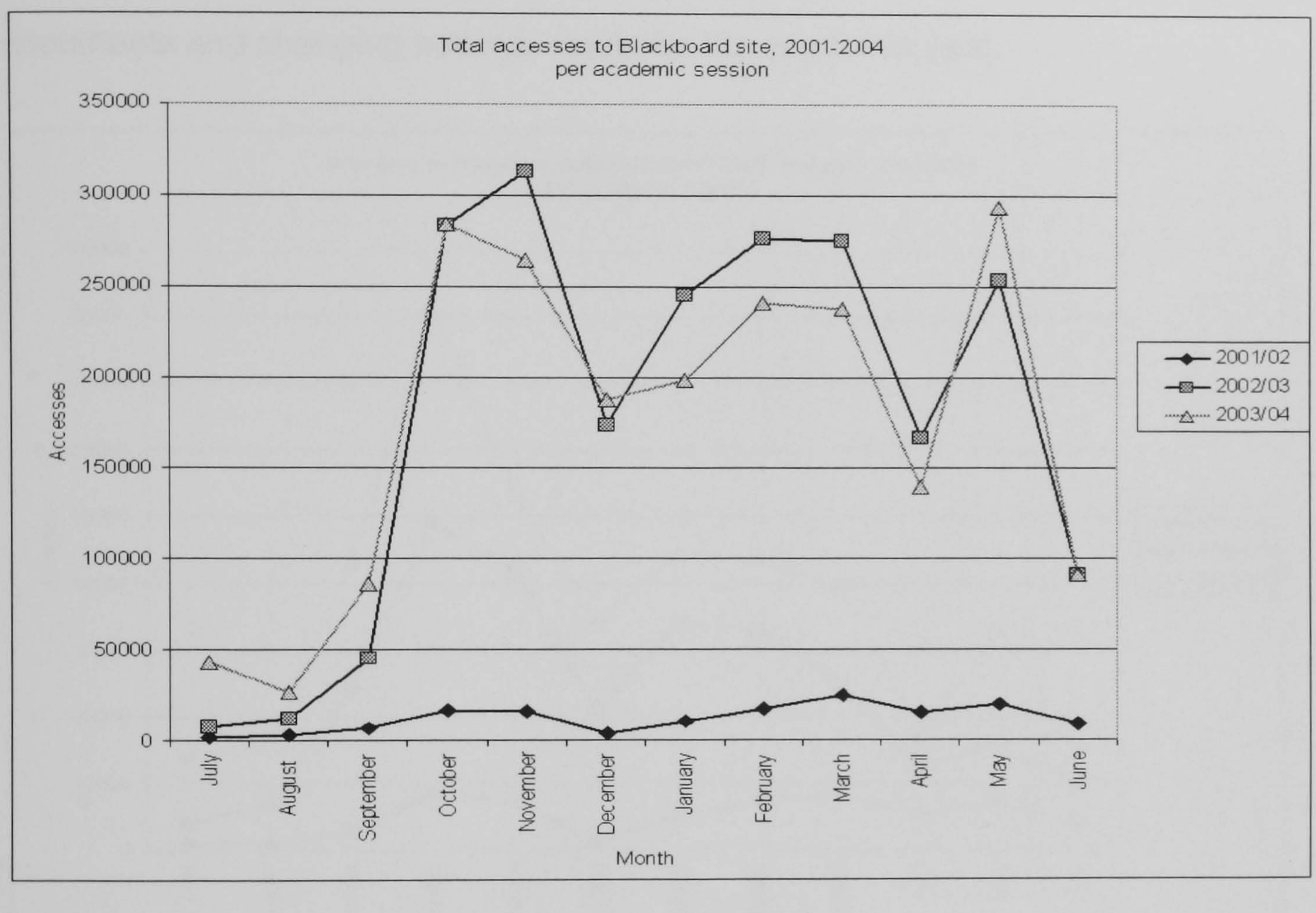

Figure 27: Seasonal pattern of accesses to Blackboard shown as total accesses per month per academic session (ALL TYPES OF ACCESS).

Figure 28 - Figure 34 demonstrate use over time for each type of use (administration, content, communication, assessment, group and student tools). These types were based on groupings of the 316 different codes that Blackboard uses to describe each individual access or 'hit' (see Appendix 12). During the three years, 199 of these (62.3%) were found to have been "in use" showing that a significant proportion of features are as yet under-used. In order to discover more about the types of usage, subtypes were also coded within each type. A listing of how they relate to each other and to the original codes used by Blackboard is provided in Appendix 12.

This analysis showed that 85.9% of all access to **content** areas is by users rather than administrative upload and organisation of the content (14.1%). As content is the most prominent activity, this in turn suggests the majority of student use is accessing content. Content administration does, however, account for 41.2% of all administrative use.

Administration use (Figure 28) peaks at the start of the year (Autumn term) and the student areas show a similar peak. In both cases users would be uploading documents and changing settings ready for the academic year.

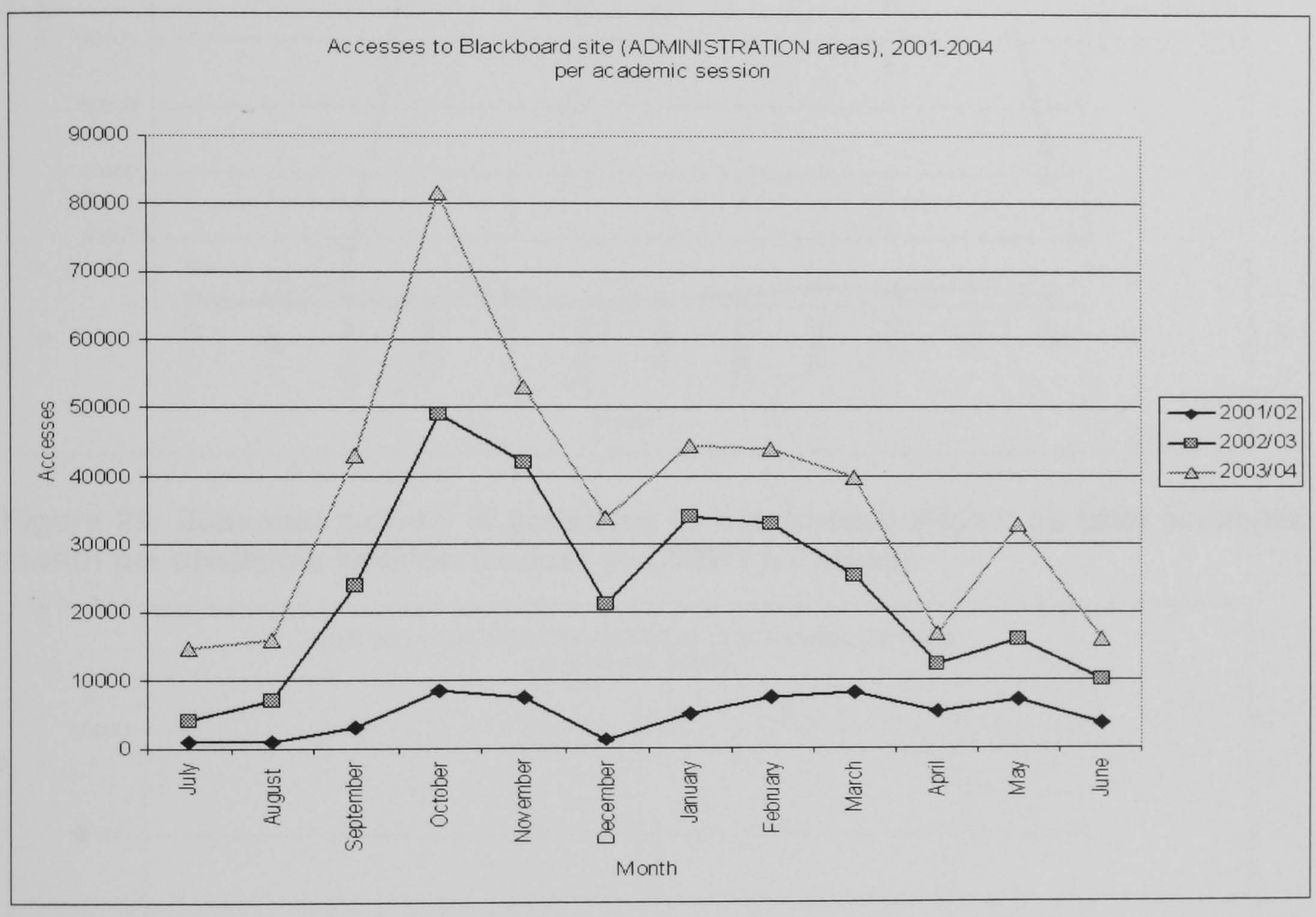

Figure 28: Seasonal pattern of accesses to Blackboard shown as total accesses per month per academic session (access to ADMINISTRATION areas).

The chart for content use (Figure 29) mirrors that for all types of access and in fact makes up the bulk of this activity. It shows the troughs in activity during vacations but these are less marked in 2003/4 even though the overall level of usage was less.

In regard to communication (Figure 30), 66.8% of activity is via the "announcements" tool but only 24.2% is using the discussion tools (8% of all use). This justifies the separation of 'announcements' accesses from 'communication' accesses for analytical purposes, and indicates that discussion is a small but

significant part of the activity. For the adjusted communication activity, 24.1%[39] involved sending emails and 73.4% was discussion board activity.

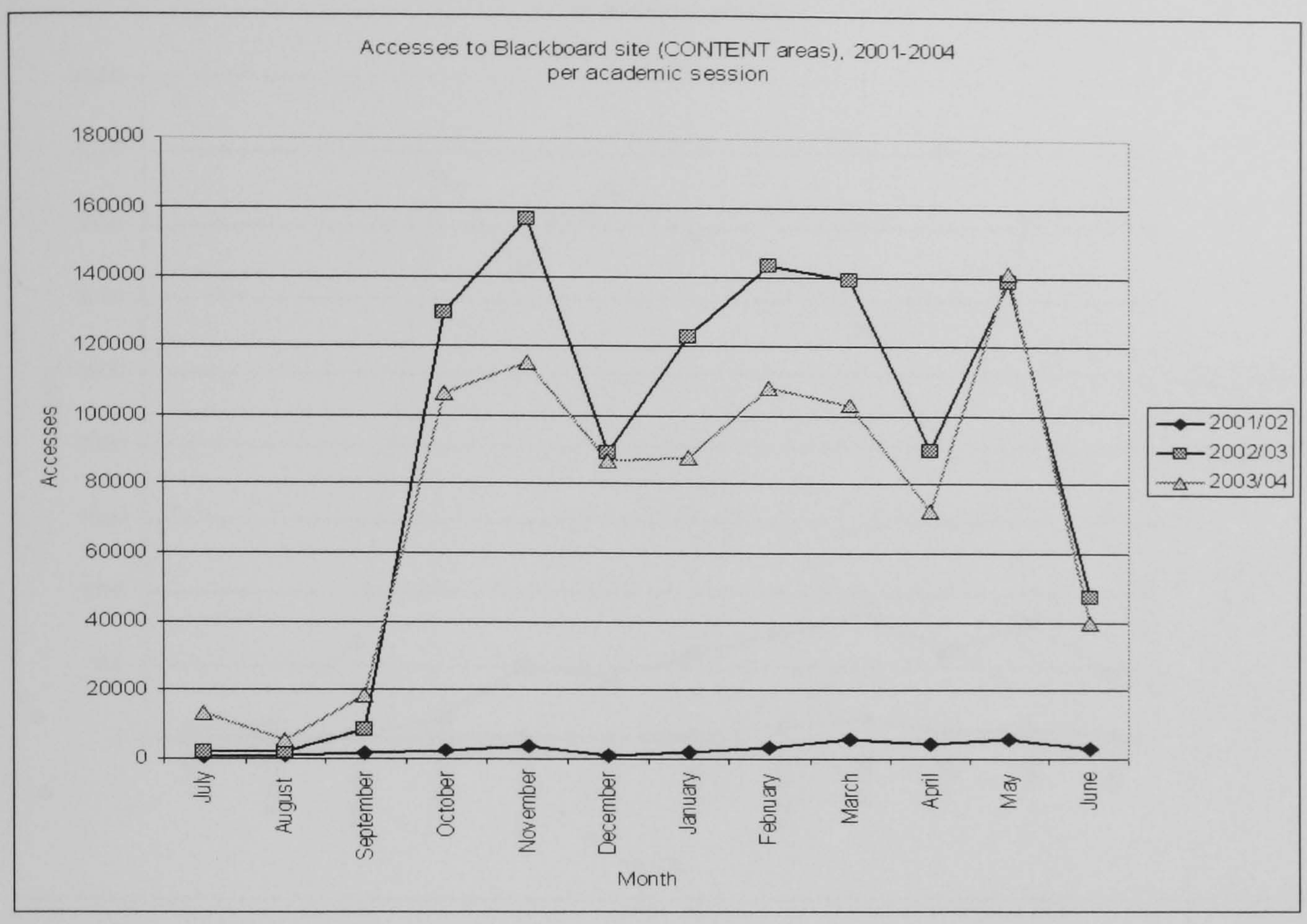

Figure 29: Seasonal pattern of accesses to Blackboard shown as total accesses per month per academic session (access to CONTENT areas).

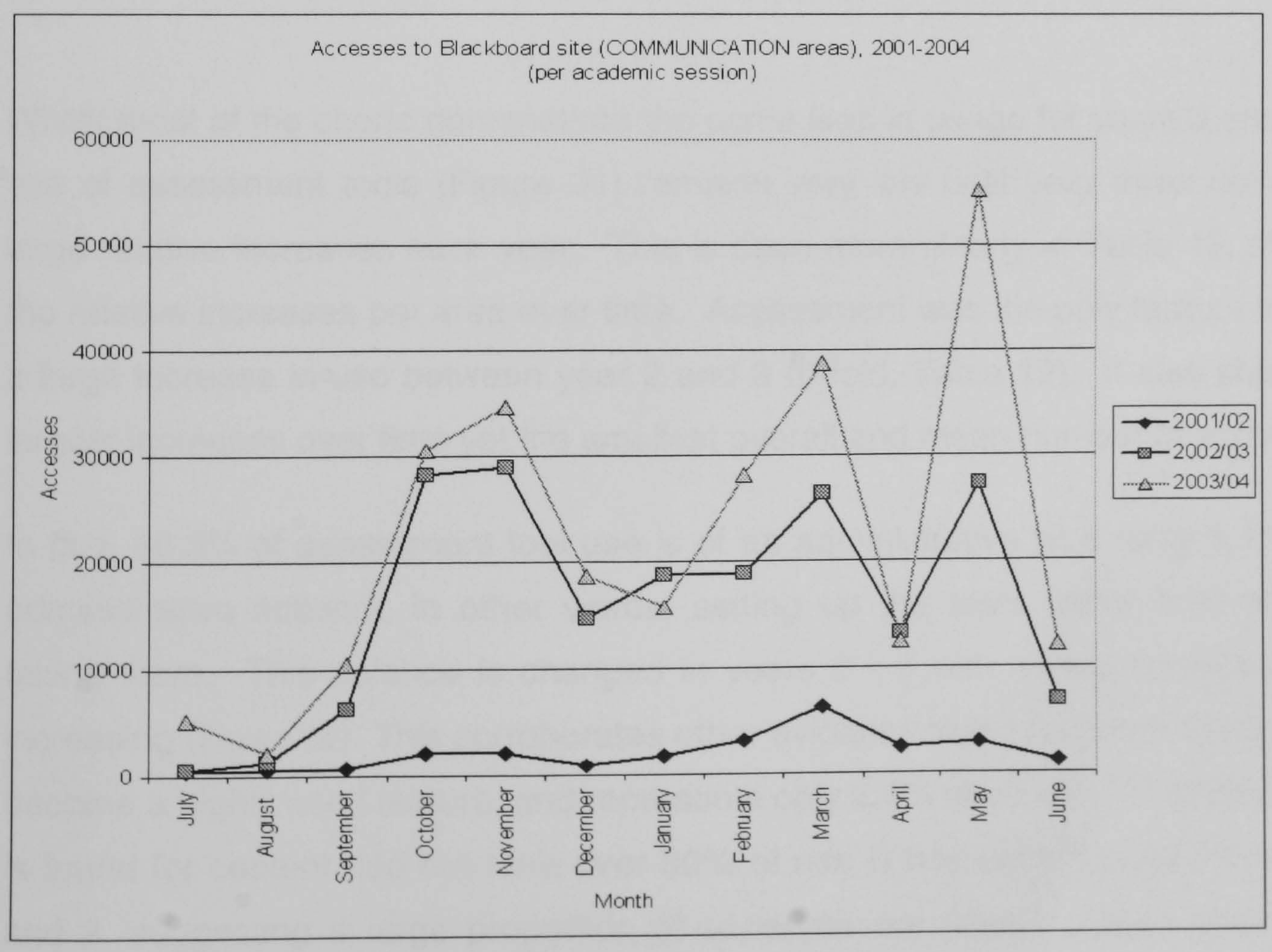

Figure 30: Seasonal pattern of accesses to Blackboard shown as total accesses per month per academic session (access to COMMUNICATION areas [with ANNOUNCEMENTS removed]).

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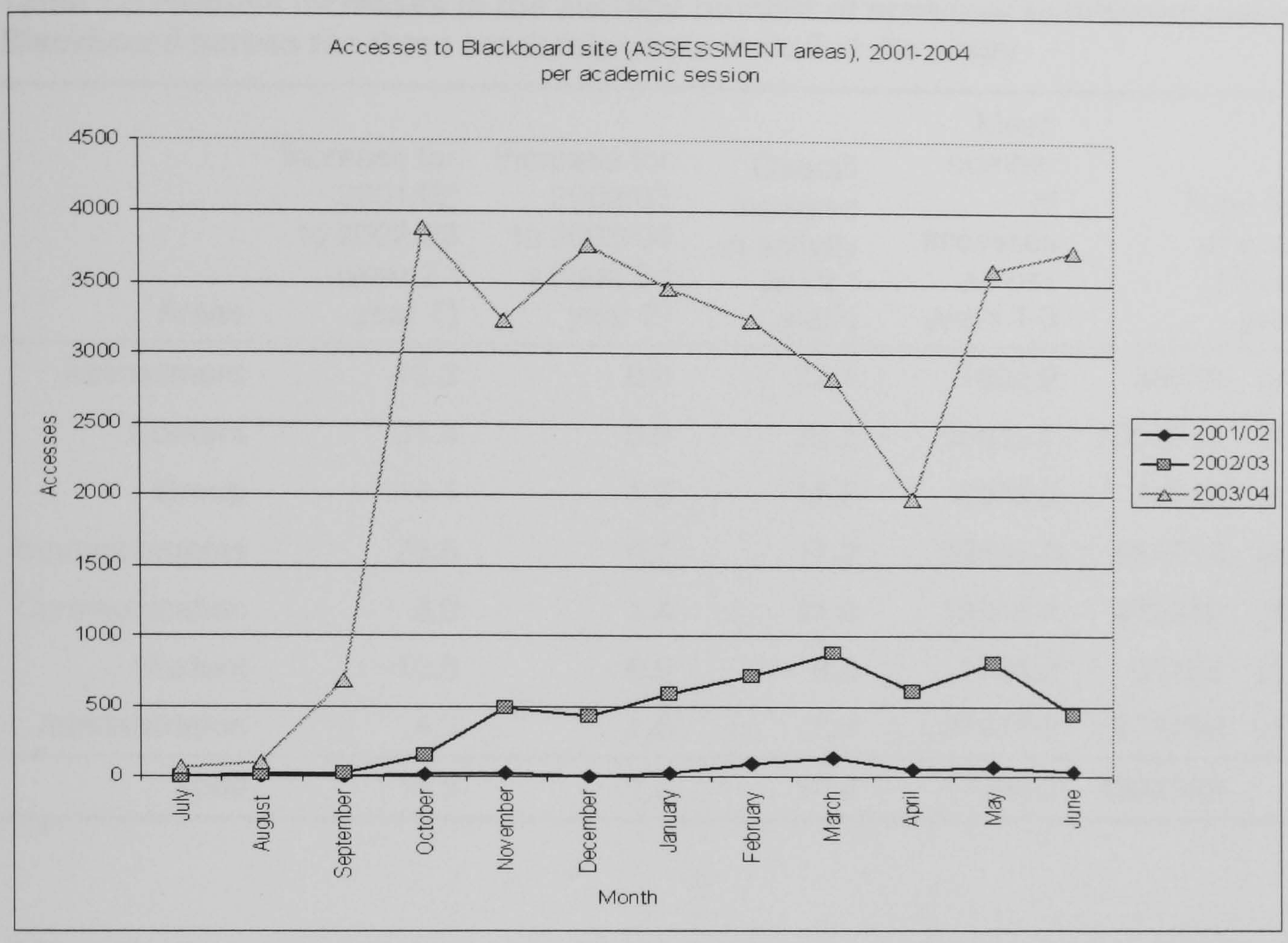

Figure 31: Seasonal pattern of accesses to Blackboard shown as total accesses per month per academic session (access to ASSESSMENT areas).

Whilst most of the charts demonstrate the same leap in usage for years 2 and 3, the use of assessment tools (Figure 31) remains very low until year three but makes large relative increases each year. This is seen more clearly in Table 12, showing the relative increases per area over time. Assessment was the only feature to show a large increase in use between year 2 and 3 (6-fold, Table 12). It also shows the largest increases over time yet the smallest overall and mean number of accesses.

In fact, 66.3% of assessment tool use is of an administrative type (only 9.1% of all administrative actions), in other words, setting up the tests rather than students taking them. This balance is changed in years 2 - 3 with non-administrative use increasing (Figure 32). This corroborates other evidence that assessment has not yet become a highly used feature, and represents only 2.4% of all use. A similar pattern is found for content use but here over 80% of use is non-administrative in years 2 and 3, suggesting a large proportion of accesses are from students opening the uploaded files.[40]

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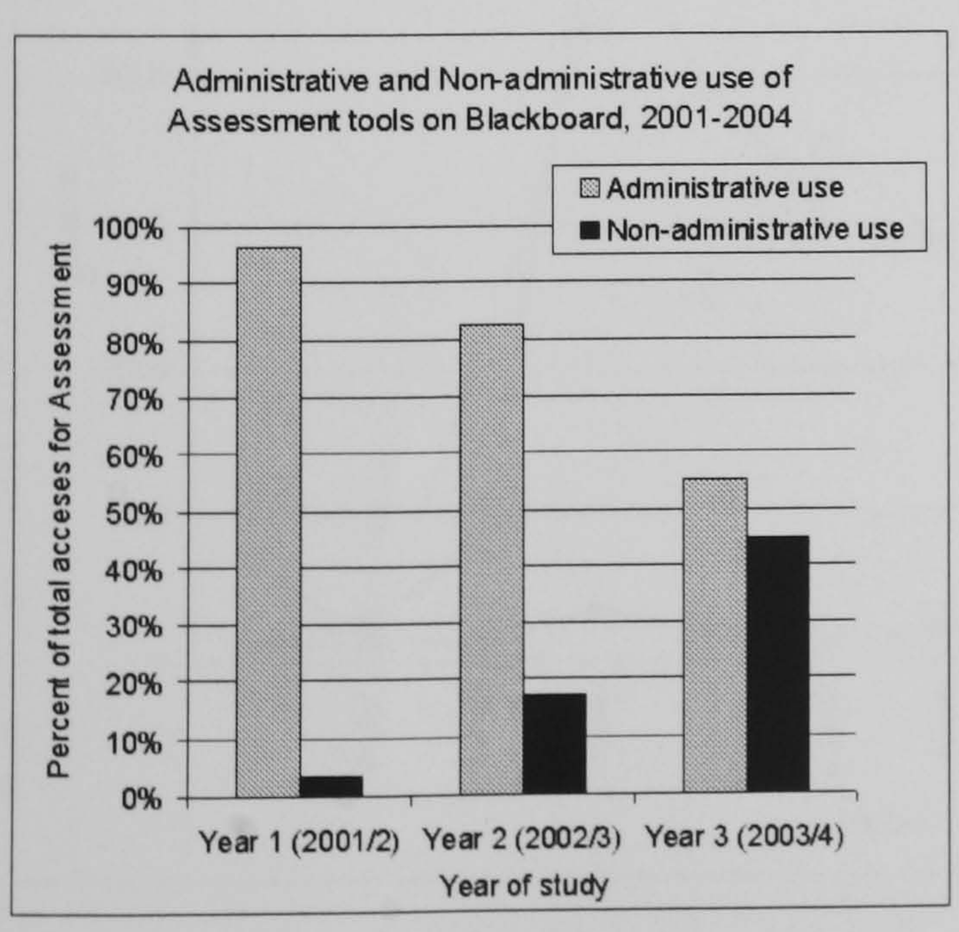
Table 12: Relative increases in the average number of accesses to different areas of Blackboard across the three academic years included the study

Areas	Increase for 2001/02 to 2002/03 (year 2 / year 1)	Increase for 2002/03 to 2003/04 (year 3 / year 2)	Overall increase in activity (yr1/2 * yr2/3)	Mean number of accesses across years 1-3	Total number of accesses (%) across years 1-3	
Assessment	12.3	6.0	73.4	1002.2	36079	(0.8%)
Content	31.4	0.8	26.3	55618.1	2002252	(45.7%)
Group	14.1	1.3	18.8	2075.5	74719	(1.7%)
Announcements	23.5	0.7	17.2	26505.9	954213	(21.8%)
Communication	8.0	1.4	11.0	13311.4	479210	(10.9%)
Student	10.9	0.9	9.8	1755.2	63188	(1.4%)
Administration	4.7	1.6	7.4	21477.2	773178	(17.6%)
Total	14.8	1.0	14.4	17392.2	4382839	

Although the descriptors in the Blackboard usage database included very few identifiable entries for student use of assessments (most entries being related to administration of assessments, see Appendix 12) the database also contains a set of "Gradebook" tables storing the details of assessments created and grades awarded. There were 3889 tests listed in the Gradebook but only 2185 grades logged against these. This tends to confirm the low level of use.



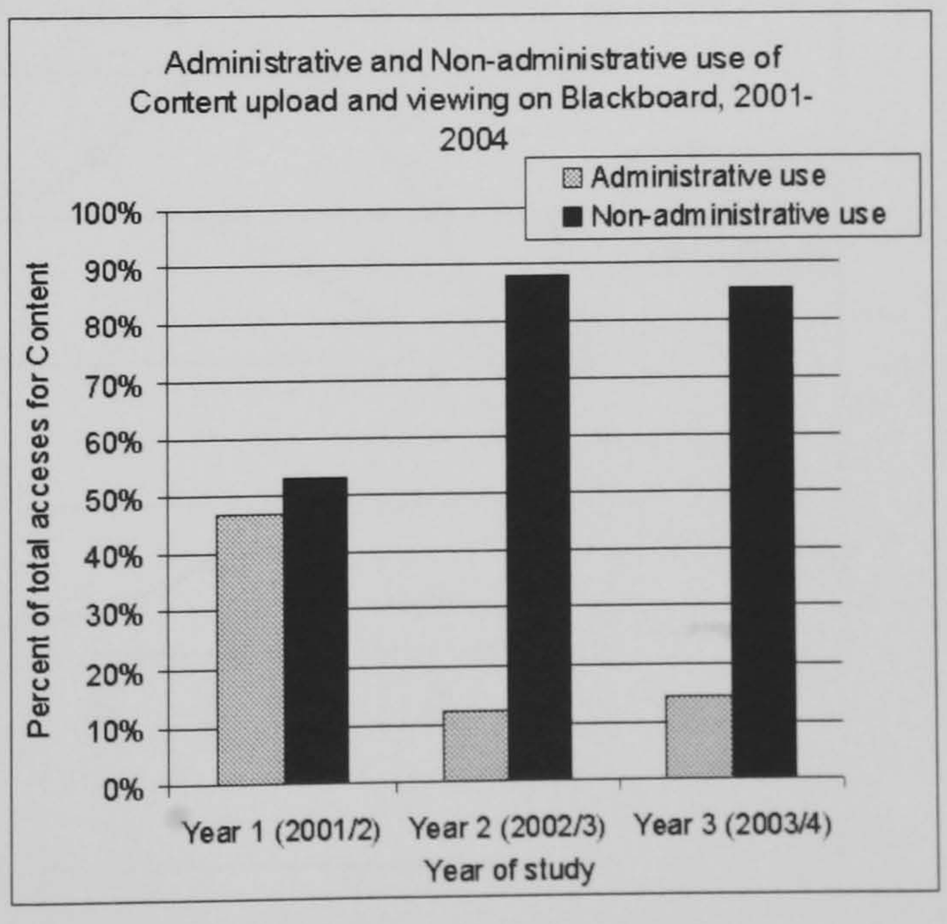


Figure 32: Administration functions for Assessment and Content upload tools (note these are percentage scales so do not take the large difference in total accesses into account).

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Supervisor: Professor Ros Sutherland

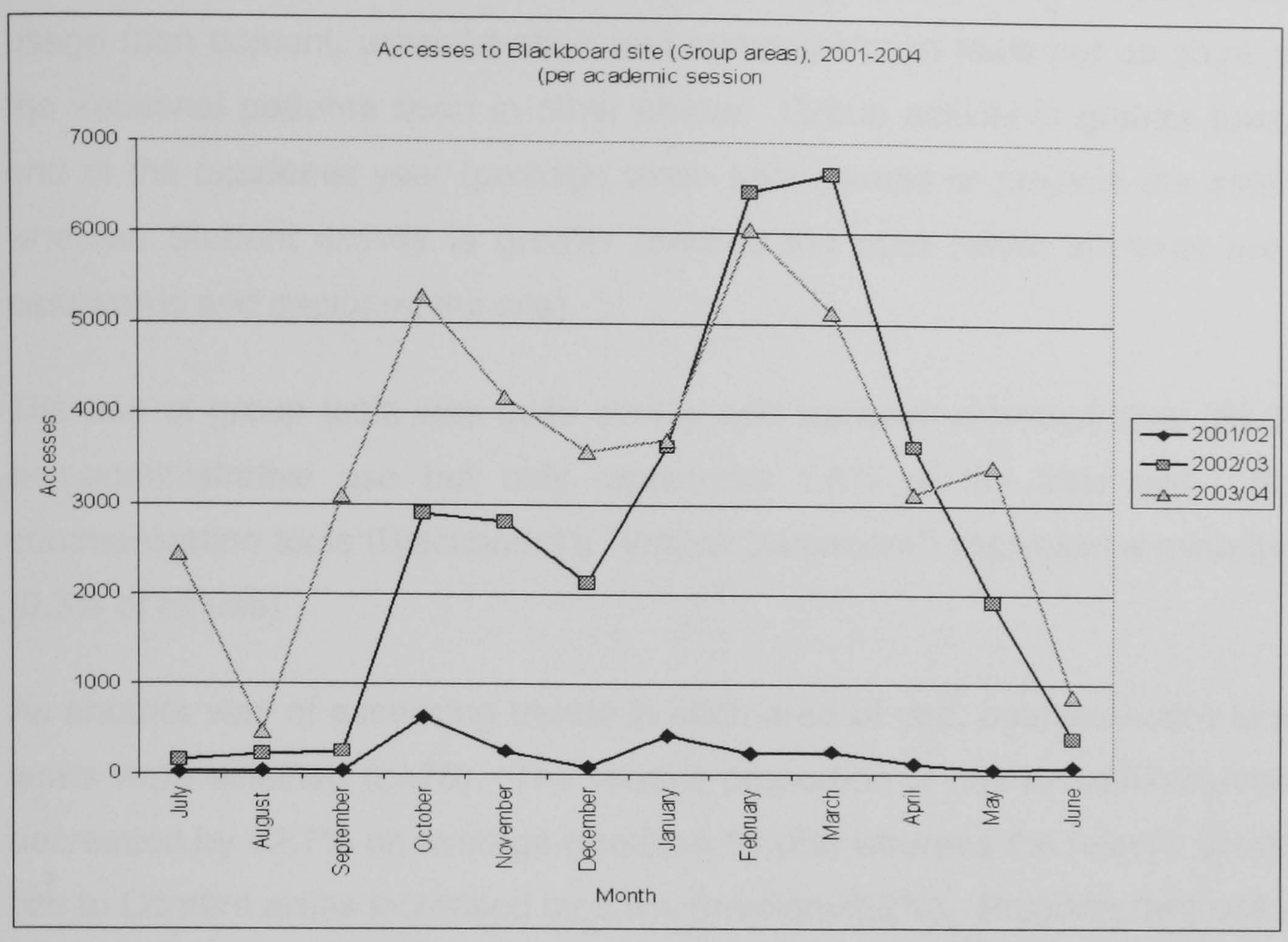

Figure 33: Seasonal pattern of accesses to Blackboard shown as total accesses per month per academic session (access to GROUP areas).

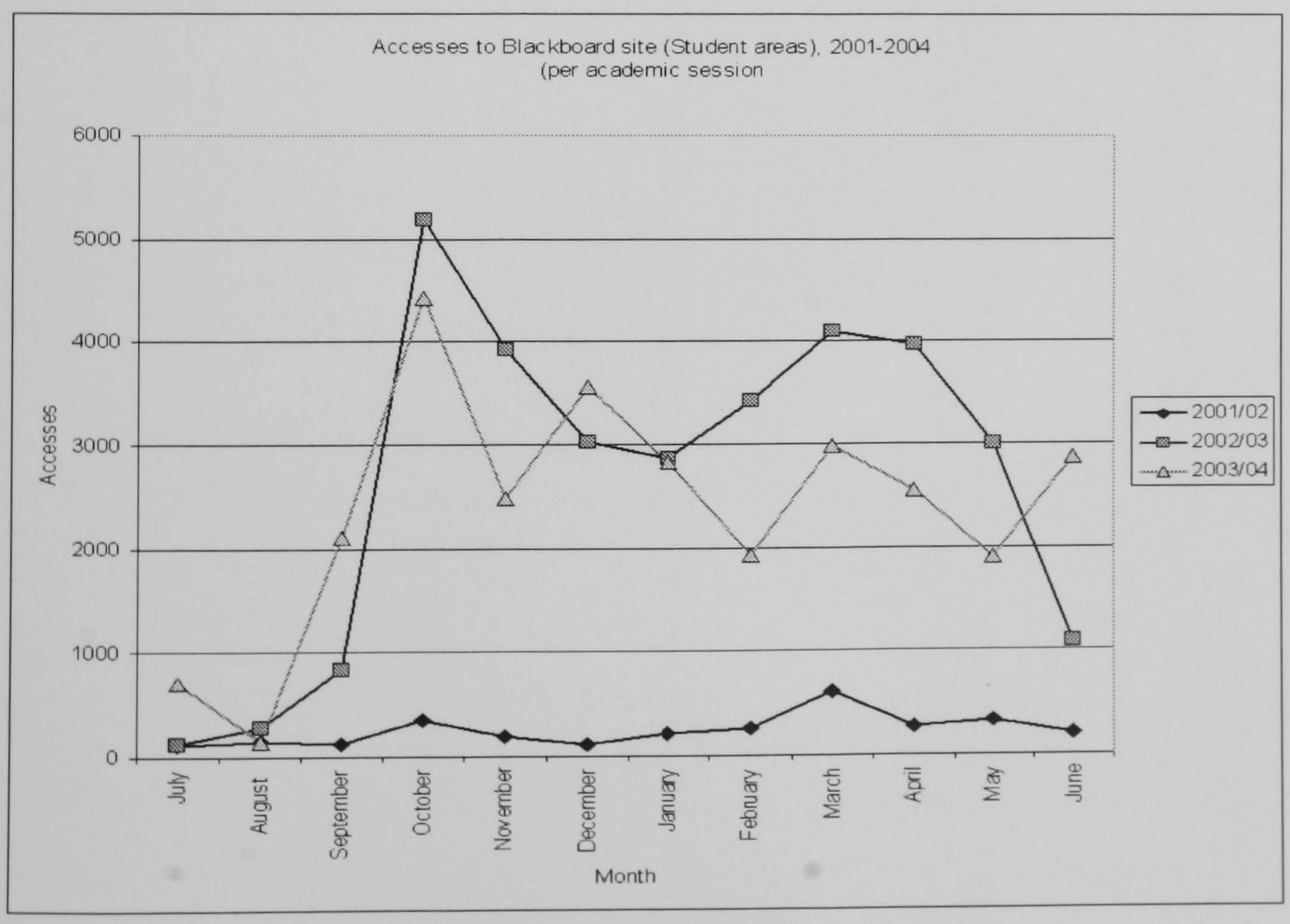

Figure 34: Seasonal pattern of accesses to Blackboard shown as total accesses per month per academic session (access to STUDENT areas).

Assessment, group (Figure 33) and student (Figure 34) areas display much lower usage than content, administration and communication tools but do show some of the seasonal patterns seen in other charts. Group activity is greater towards the end of the academic year (perhaps when tutor groups or projects are established) whereas Student activity is greater towards the start (when students are setting passwords and exploring the site).

The use of group tools was quite evenly split between administrative (58.3%) and non-administrative use but only represents 1.8% of the total use. Real-time communication tools (Blackboard's "Virtual Classroom") represent a minority aspect (0.3% of all use)

As another way of assessing trends in each area of use, courses active in all three years were selected (n=75). The relative proportion of hits to Administration areas decreased by 12.7% on average (median=14.0%) whereas the relative proportion of hits to Content areas increased by 8.9% (median=8.2%). Proportionate use of other tools showed little or no change on average, although Assessment and Communication increased by 1.9% and 1.7% on average respectively (medians 0.2% and 2.0%). Therefore the function with both the most accesses and the largest increase in use overall was the uploading and viewing of content.

4.5 Chapter summary

An initial analysis of user statistics provided a sampling frame for the selection of a range of courses for further analysis and academics to invite to the focus group and interviews. Subsequent statistics gave a detailed picture of the use made of Blackboard over a three-year period and aided the interpretation of data from this qualitative work.

During the first year after installation, there was a doubling of the overall number of accesses but a significant portion of this activity was administrative – instructors setting up their courses and experimenting with the system. The majority of the courses observed were focused on undergraduates and these courses showed the most consistent seasonal activity pattern. There then followed a very large upsurge in activity, then little increase between years 2 and 3. The great majority of this usage consisted of the upload and viewing of learning materials and the use of communication tools, with the former showing a larger increase in its share of the activity. All other features were used far less frequently. Assessment, however, showed greatest increased usage relative to its own baseline (though the absolute number of accesses was on average 100 times lower than content and thirty times lower than communication).

Administrative use showed a peak in term 1 each year and all other features tended to rise and fall through term-time and vacations respectively. Over three years, however, the use of administration declined (by a median value of 12.7%) and content upload rose (8.9%).

In summary, Blackboard activity has been dominated by the upload and viewing of content (45.7% of all accesses) whilst announcements and communication made up 21.8% and 10.9% respectively. There is evidence that the low level use of assessment tools (0.8%) is rapidly increasing.

In the next chapter, the qualitative data is analysed for explanations of these usage profiles and perceptions of staff using the system.

Chapter 5: Qualitative results and analysis

This chapter begins with a description of the qualitative data collected and the broad categories applied to the comments arising. It goes on to discuss the specific themes discovered in the interviews in relation to these categories, using quotes from the data to illuminate and contextualise the issues.

5.1 Qualitative data

The interests of the people involved in the focus group and interviews are shown in Table 4 and Table 7, describing the range of activity sampled (also reflected in the quantitative data: Figure 16 p68 and Section 4.3.2 p73) in terms of

a) undergraduate and postgraduate uses

b) different departments and cognate disciplines

c) teaching, supporting and strategic roles

The focus group and interviews were designed to investigate the perceptions of staff in relation to the research questions (1.4) and the analytical framework (2.13). To this end, an exhaustive, iterative process of coding and interpretation of the text was carried out. Table 13 is a breakdown of the number of codes developed at different stages, showing that 1436 (47%) of text passages are coded using codes common to Phase 1 and 2 interviews. Also, 1016 passages (34%) are coded using codes originating in the Focus Group and all active codes from the Focus Group re-emerge at other stages. As the study progressed, the mean number of passages coded using "surviving" codes increased, implying an increasing focus on key themes as expected when using grounded theory.

The codes were organised into hierarchies, placing similar codes together in a category and similar categories within higher order containers. The top level containers are listed in Table 14 (p92), along with the numbers of codes within them and the number of passages to which these relate. These containers were

developed from both the theoretical framework (sections 2.13, 2.14) and themes of interest emerging from the data. It was then possible (using the N-Vivo software) to continually review the meanings generated within the overall analysis and how these fitted together by readjusting the hierarchy of themes as the data were read and re-read. Frequencies of occurrence for each code were also generated to assess the most frequent themes (Appendix 13). The major themes will be used in the discussion and interpretation of qualitative results.

Table 13: Qualitative analysis codes used in the study

Codes that are present in:			Number of codes linked to at least one text passage		Number of passages linked to these codes		Mean number of passages coded per code
Focus Group	Phase 1 interviews	Phase 2 interviews					
✓	✓		138	(17%)	567	(19%)	4.11
	✓		231	(29%)	614	(20%)	2.66
		✓	241	(30%)	427	(14%)	1.77
	✓	✓	144	(18%)	987	(32%)	6.85
✓	✓	✓	47	(6%)	449	(15%)	9.55
Totals			**801**		**3044**		**3.80**

The Focus Group will be mentioned briefly in terms of the use made of Blackboard and reasons for attending. All other data from the Focus Group will be incorporated alongside data from Phases 1 and 2 within other sections for simplicity and to provide a more longitudinal analysis. Themes will be covered in the order shown in Table 14, leading from details of usage logically through the various types of staff perceptions to institutional and strategic issues. The **current use** of Blackboard will be discussed first, followed by the perceptions and roles of **teachers** using the system and the inevitably interrelated **student** issues. This will lead into a consideration of the **pedagogical** aspects of Blackboard use – what sort of learning paradigms and affordances can be ascribed to the learning environment? Next, comments about the **implementation** of online learning environments are looked at. A relatively high proportion of coded passages relate to **technological** issues such as the administration and development of the system and its relationship to other systems. These will be dealt with next. Finally, choices about technology are rooted within an organisational context and so issues relating to the **institution** and to **policy & strategy** will then be considered.

Table 14: Descriptive containers used to organise codes generated from the qualitative data

Section	Descriptive container		Interpretive Framework*					Number of Codes	Number (%) of Passages coded	
			1	2	3	4	5			
5.2	Focus Group…	why participants attended						8	15	(0.5%)
5.3	Current use…	of the system	■					86	383	(12.6%)
	Affordances…	of the system	■				■	26	170	(5.6%)
5.4	Teachers…	how they perceive and engage with the system				■	■	57	294	(9.7%)
5.5	Pedagogy…	the learning paradigm inferred from VLE usage		■	■	■		100	422	(13.9%)
	Students…	and how they relate to the system		■	■	■		51	160	(5.3%)
5.6	Technology…	of Blackboard and related systems		■				140	523	(17.2%)
5.7	Implementation…	of the VLE		■			■	56	207	(6.8%)
	VLEs…	perceptions of VLEs in general		■				26	147	(4.8%)
5.8	Institution…	institutional issues, culture and context		■			■	69	245	(8.0%)
5.9	Policy & Strategy…	in e-Learning and technology		■			■	182	478	(15.7%)
	Total							801	3044	(100.0%)

*** Interpretive Framework:**

1. Use in the areas of **content** (upload of teaching materials), **communication** (discussion boards, email and other tools) and **assessment**. Other uses of the VLE were categorised using terms applicable to the usage data generated from Blackboard.
2. Perceptions of use relating to four levels of activity: issues relating to **technology**, **pedagogy**, **implementation** and the **institution** (Collis & Moonen, 2001).
3. The extent to which students were encouraged to **acquire** knowledge and/or **participate** in collaborative learning (Collis & Moonen, 2001).

4. Learning activities as described by staff and whether these related to the categories: **dialogue**, **involvement**, **support** or **control** (Coomey & Stephenson, 2001).
5. Successful implementation and use of a VLE is as much (perhaps more) dependent on social as technological factors. Socio-cultural and sociological interpretations are therefore valuable in understanding processes involved in implementation.

5.2 Focus Group

This provided a first opportunity to ask staff about their perceptions of Blackboard and generate further questions for the interviews. The makeup of the group is described elsewhere (Section 3.3 p55), but their use of Blackboard is discussed briefly here.

Whilst the presence of additional staff members was a potential bias (participants might have felt they needed to say positive things about Blackboard or the support for it) this does not appear to have been the case and comments were frank and objective.

> "...the reason why I want to be here is I think the LTSS and the other support groups we have, need to get our feedback and it's important that we give feedback," (119-AC-FG)

> "...when [students] found they couldn't access it off site, their enthusiasm bombed. I mean that problem's been fixed now but it had a bad effect on student confidence." (118-AC-FG)

> "...I had to basically edit all of the links all over again and just take out one 's' and go through a number of pages and take out one 's' each time, and then reload them and sort of overwrite them on the University web. That was a bit of a pain in the neck I must say." (116-AC-FG)

Participants were using Blackboard in a range of different scenarios – small and large groups, postgraduate and undergraduate teaching. Most of the courses were based in Bristol but some involved students distributed across the southwest region and one teacher was supporting a course in Hong Kong. Undergraduates taught by people in the group ranged from the School of Medicine (a large number of students distributed across a selection of off-campus placements) - to a class of 3 studying Arabic Language on site.

The main uses of Blackboard appear to have been distribution of materials, online discussion and course administration. No use had been made of Blackboard assessment tools by people in this group.

Reasons given for attending the focus group included: the need to share good practice or to become more proficient; having a responsibility in their department to

investigate new learning technologies; a chance to provide feedback to the centre. One person expressed an interest in the educational issues using a VLE raises. The most often mentioned reason was sharing practice (12 citations).

> "...I wanted to pick up tips and hear what other people are doing with Blackboard..." (117-AC-FG) [41]
>
> "...I came along because I'd like to hear what people are doing so that I can start using it to the full extent of its functionality because I feel that I'm just sort of tinkering around at the edges ..." (116-AC-FG)

The group was therefore diverse in terms of subject specialty and the size and distribution of student groups but had a shared interest in making the most of online learning.

5.3 Current uses of Blackboard

The uptake of Blackboard across and within departments has been uneven from the outset. The Phase 1 usage, Focus Group and interview data indicate that initially a few enthusiasts started to use it for specific purposes. Table 15 and the following quotes show the diverse reasons quoted by academics for its use.

> "...what I really wanted to do was to get the staff to be able to publish their own lecture notes as and when they wanted on the Web." (409-AC-P1)
>
> "...to support the courses and workshops..." (301-SS-P1)
>
> "...to provide a back up resource to my face to face teaching ..." (512-AC-P1)

Table 15: Reasons given for adopting Blackboard (from Focus Group)

- Providing better support for particularly large and/or geographically distributed student cohorts or distributed groups of staff.
- Promoting interaction and collaborative learning through the discussion board and other features.
- Improving ICT skills through the use of an online system.
- Improving the quality of teaching.
- Supporting learning in the absence of a teacher.
- Easing administrative load.
- Blackboard was available / going on a course on Web-based learning.
- Other reasons including previous positive experiences, word of mouth, wishing to be an 'early adopter'.

Blackboard use has tended to fall in to one of three broad categories:

a) providing information and documents relevant to their course (Storing Content)

b) online discussion and collaborative learning (Communication and Collaboration)

c) online assessment

Of these the first was the most common (reflected in the usage data), as discussed by a member of the support services with responsibility for managing the Blackboard server.

> "...from the cursory look I've had in courses... talking to people, so it's not necessarily a truly representative sample, but I'd say probably about in excess of 80% is probably still just content uploading, it's that... or course administration... Announcements as you'd expect are useful and are being used, [on] some courses only. The use of the on-line assessment and survey tools are very – they appear to be quite subject specific." (221-SS-P2)

This estimate tallies well with the quantitative data. If one removes administrative use and announcements (because these are set as the front page of most courses) then content upload does indeed account for 80.5% of use in 2002/3 and 71.1% in 2003/4. However, this quote also suggests one should not discount the use of announcements simply because they are on the front page of the courses.

The remainder of this section will look at the three types of use above in a little more detail.

5.3.1 Storing Content

Being able to place everything for a particular course in one place with a single Web address was often mentioned as a key benefit – a kind of "one-stop-shop". There is also a reduction in administrative load afforded by this.

> "... sometimes I'm saying to students during a seminar discussion 'I'm not going to give you this piece of information because it's there on the Blackboard site, go and find it'. And so in the long term I can see that it will mean that we don't waste a lot of time in the class doing simple administrational things, handing out handouts and that sort of thing..." (116-AC-FG)

> "...the ability to put everything in one place... Also being able to load up Word files, PowerPoint, those kind of things, all within the same frame has been quite useful. I suppose just really the variety of formats" (314-AC-P1)

This "virtual filing cabinet" approach had its detractors, more often amongst the support staff, who felt that simply uploading files is not in itself going to enhance teaching. Using uploaded material in some level of dialogue with students was thought important. Note that quotes are from both Phases of the study.

> "...we are talking about large word documents that you really can't read on screen... it just becomes another way of distributing documentation. It doesn't become a different way of learning." (403-SS-P1)

> "...they'll put some lecture notes up and that in itself is not constructive, but... getting students to look at things before and after lectures or using that to talk about things within a tutorial... can become constructive." (302-SS-P1)

> "The least constructive is probably as I've mentioned just putting materials up there without thinking about the purpose of them in any way... ideally it would be making them more integrated into the teaching - making them more of an on-line interactive resource, rather than a static page." (220-SS-P2)

Nonetheless, academics found it an effective way of distributing materials. Placement of curriculum information for staff to cross-reference was also an important, enabling colleagues see how the programme fits together:

> "I think in terms of not so much the students but the staff, I think it does provide even at the minimum level this ability to cross refer to things that you're not involved in... you get that minimum structure there which is there to aid this understanding of what's going on in different parts of the programme." (515-AC-FG)

Evidently Blackboard has been seen as a useful single point of information for all involved in a course. Whilst this can be provided by a basic Web site, other available features appear to provide an important reason for using Blackboard.

> "...there's a sense in which Blackboard could clearly be used for some of the functions that we use our own intranet for... Where Blackboard is good though as an advantage over the intranet is the, the fact that it's potentially interactive... which we can't do currently, on the intranet, which is its big plus point" (310-AC-P1)

A big draw of the system therefore is the range of tools available.

5.3.2 Communication and collaboration

Communicating with students via the announcements and group e-mail functions remained an important tool across both study Phases. It provided a simple method of contacting groups of students (once enrolled) that would be much more complicated with a standard email system.

> "...one of the useful features... is bulk e-mailing... lists which serve multiple purposes all at once... without having to go away and do it in a different medium. different platform..." (515-AC-P1)

> "...people are using it for announcements and using it as a way of grouping people so they can e-mail them... I think that's valuable." (515-AC-P2)

There was also interest in collaboration and interactivity.

> "Well I think it gives you the opportunity to work on a team project without actually all being in the same room." (314-AC-P1)
>
> "But also promoting collaboration... so they're learning together and the discussion board I found particularly useful in that. So putting up a topic for discussion and getting them to respond to that through the discussion board. And you know that's kind of learning that can go on without me really being there. I set it going and then see what happens. So that's quite nice, yeah." (117-AC-FG)
>
> "I think for me I've used it to try and promote different kinds of learning that otherwise would have a lesser emphasis. For example group learning through the discussion board and learning to use the internet and ICT resources..." (512-AC-FG)

The use of online discussion tools was also felt to have a positive influence on learning groups. The tools offer additional opportunities for students to get acquainted, form cohesive groups that might then be more effective at learning as a team. Many have found this difficult to achieve, however.

> "I think the thing that has never really taken off is the discussion boards... they certainly use Blackboard quite extensively, but they don't really use the discussion board, but I think it's because they're all close together. They see each other quite frequently and they meet once a week..." (515-AC-P2)

Others remained unconvinced of the utility of online discussion in their subject area.

> "...I tried to get all the students just to put up a one-sentence thing, why they are doing this unit, and hoping that something would spur off from that, nothing has, they all just put up one sentence and that was it... they don't feel able to respond to it..." (116-AC-FG).
>
> "Well I think that's something [discussion boards] that might come. I mean it's just interesting there isn't very much student pressure or interest in that kind of thing..." (409-AC-P2)
>
> "...I think it is a difficult skill... I have seen people who have done it well and it seems that you have to put a lot of effort in." (220-SS-P2)
>
> "I've heard this a lot from a lot of different people: 'I've set up a discussion board but nobody is using it'... And there is this thing about people setting up a discussion board and they just tell the students it's there and then they expect it to get used..." (403-SS-P2)

These quotes suggest a mixed response to online discussion tools. Those with a specific collaborative task in mind may persevere and become more involved in making the discussion board work, whereas others concentrate on using other functions.

5.3.3 Assessment

As shown by the usage data, assessments made up a very small (but rapidly increasing) proportion of the activity. Electronic assessment was not used formally by anyone in the focus group (Autumn 2001, early in the implementation) – although one or two (those involved with larger programmes) expressed an interest in using it.

Some academics were concerned that the forms of assessment they normally rely on in their subjects would be too cumbersome, time consuming or insecure if used online. Some were also concerned about the sheer numbers involved on their course or that the format of the assessments would not suit their subject area.

> "...you've got an essay from each student, and the amount of work that you would have to do to read that would be enormous, to give feedback... you couldn't physically read that much material." (119-AC-FG).

> "... the assessment tools aren't useful for me... because I work in very, with very open ended and formative assessments..." (512-AC-P1).

> "We don't do objective assessments full stop. There's a lot of security consequences of getting into that. We do have hard copy assessment schemes that work about as well as they can possibly work, so I think no-one really wants to unpick those." (409-AC-P2)

These comments highlight the problems of summative assessment online but ignore the possibilities of formative feedback to students, perhaps between students in organised groups. Assessment tools were being used, however, by three of the academics interviewed. This was for topics that lent themselves to 'objective test' approaches (multiple choice questions, true-false questions and so on). The academics were all using them in a formative mode – to help students understand the topic more thoroughly and to get more information about students' understandings of the topic.

> "I think it was more to try and get the students to process the information that they received in the lectures, for those that would. When it comes to the exam you just get back the same information that you have given so what I was trying to do was to put on some quizzes to engage them a little bit and get them to test whether or not they had really understood it rather that just copying down. I got a lot of diagrams back, which were exactly the diagrams that I had showed on the slides. Sometimes without any text to go with them so you weren't really sure whether they had understood what was going on in the diagram. So I designed the quiz to test whether or not they understood things like the function of particular molecules or what the consequences for a patient might be or that kind of thing. To get them to think a bit more." (306-AC-P1).

Judging from the usage data and other comments, this kind of approach has been rare and the majority of staff are not using Blackboard in this way.

5.3.4 Less popular features

Under-used features included the Virtual Classroom (a real-time chat tool), student homepages (individual pages for students to post text and links) and the Digital Drop-box (assignment submission tool). This has been due to a lack of understanding of their use or an absence of need at the present time, but some could see potential uses for them. Comments on this are shown in Table 16. The level of knowledge of these features appears generally low but quote 4 does show some academics' level of enthusiasm for potential uses of the system.

Table 16: Comments relating to the under-use of certain features of Blackboard

Virtual Classroom	1. "I am not sure I would ever use the virtual chat or anything like that but I can see why some people might. If it could be organised to set that up it could be quite fun." (306-AC-P1). 2. "I haven't used a Virtual Classroom but I'd certainly be quite interested..." (313-AC-P1). 3. "[the Virtual Classroom] seems to be quite useful although we haven't actually tried that yet." (314-AC-P1) 4. "A third area that I'd really like to see developed is the Virtual Classroom aspect. We do a lot of supervision of students in Hong Kong and it would be really good to be able to share a piece of work on Blackboard to be able to look at a Student's chapter or a Student's draft essay regardless of where that Student happens to be at that particular point in time and to communicate either orally or by using the keyboard in real time to comment on that. In other words to have a one-on-one tutorial on-line with the material visible." (512-AC-P2).
Digital Drop Box	5. "I think the digital drop boxes we haven't used, we have enough procedures in place for the collection of essays and things like that." (409-AC-P1). 6. "We have tried the digital drop box but it's been a bit unclear as to how that works, I've found that a bit confusing." (314-AC-P1).

Also underutilised was the creation of Group areas within a course for tutorial and other groups of students. Enrolling students into such groups had to be done one by one manually which probably explains why it was not popular[42]. It was also suggested that this level of collaboration may not fit within the institutional context.

> "...I think one of the main reasons for that is its sheer clunkiness... There's no batch enrolment to groups at all... But also I don't know how much there is a kind of group ethos anyway. I don't know if you could actually do group work really." (403-SS-P2)

Possibly this indicates the presence of assumptions about the learning process and Blackboard's capabilities.

5.3.5 A 'Nursery Slope'?

The university had a strategy of installing Blackboard as a "Nursery Slope". It was hoped that it would introduce easy to use online tools, and that once an initial administrative or teaching need had been satisfied, staff would begin to experiment and think about other more creative uses of a VLE.

> "I think they chose it because it was easy to use... on that basis it's worthwhile because I think people can pick up on it very quickly..." (301-SS-P1)

> "...the suck it and see approach, using Blackboard as a nursery slope and as it were embedding it by osmosis that those are positive things in the Bristol context." (405-ST-P1)

> "I think it's nice that you're starting to see people not just putting materials up, but actually beginning to explore how they might do some really creative things... Actually I think it's almost been a catalyst to think about how to do some more exciting things with students that they probably could have done face to face, but the technology is kind of enabling them" (302-SS-P1).

The dramatic increase in use between year 1 and 2 supports this strategy of enabling people to experiment. On the other hand, there has been limited evolution from initial usage patterns – usually content uploading – to the chagrin of the support staff.

> "I think a lot of the people who I see... it's a first step for them. So a lot of them now are starting with content and sometimes – and I don't think it's a good idea – but sometimes it's used as a way of distributing materials to students" (220-SS-P2)

> "I don't think it's really changed to be honest... the people that are trying to support it and encourage it with the e-learning strategies are in a sense hyping it up and get very, very excited about it, but the message isn't really getting out and isn't bringing enough people in. So at the moment I'd say over the last few years it's been a slow increase by academics talking to academics..." (221-SS-P2)

In view of this and results presented in previous sections, Blackboard uptake could therefore be characterised as "*limited pragmatic utilisation*". This has prompted those with a more strategic role to question the extent of use in relation to its capabilities, asking, what is specific to Blackboard as a system that could not be delivered otherwise?

> "...this is my worry, increasing worry about the kind of pedagogical inbuilt functions about VLEs. I think on the whole they have been probably most usefully been used for course administration... I don't think it's hugely innovative – I think maybe people are finding their feet... I really don't think that we're using VLEs on the whole very imaginatively and that's not just at Bristol but nationally" (304-ST-P1)

> "More anecdotally I've heard people using Blackboard as a place to upload Word documents and whatever and clearly... you don't need Blackboard to be able to do that, but I keep hearing the refrain, especially from the learning technology fraternity that Blackboard makes it all easier, which is something I find difficult to accept because the uploading process is very bitty. You've got to upload one thing at a time..." (405-ST-P2)

This echoes some of the comments about the simple storage of content being, on its own, a less than constructive use of the system.

5.4 Teachers issues with Blackboard

A number of issues seem to have been important to academics enthusiastic about Blackboard. They seem to be exposed to certain pressures because of their involvement.

5.4.1 Isolated innovators

Interviewees selected were by definition innovators in using VLEs, and the patchy use by other staff had not escaped their attention. New methods can be unpopular, and can make those promoting them unpopular – an important issue in view of the necessity of student feedback.

> "...it's early days, but a lot of my colleagues are feeling that 'It's not appropriate to my unit to use Blackboard, so why should I feel the pressure of this smart Alec, ------ ------ using Blackboard and the students saying 'Oh I like this' and it's quite good fun, why should I feel the pressure to introduce that?' " (116-AC-FG)

> "Our experience when we introduced computers into teaching... was that the one lecturer... who did this, he got terrible feedback from the students because he was making them do things which they found foreign and alien and it's far better just to go to one of my lectures where they got everything spoon-fed to them and they went away without having to do any work for themselves." (119-AC-FG).

This common problem for innovators means that there is an environmental pressure acting against the adoption of new technologies even if easy of use and effective. Staff deciding to develop online learning can end up feeling a little isolated, and appreciation of their efforts was felt to be scarce.

> "...there's a big workload involved here for us all... I don't even think there's an appreciation of it, I don't think in our department that the Chairman and so on really know what Blackboard's all about and what's involved to make it work." (119-AC-FG).

Another pressure for innovators was that of becoming the *de facto* guru on use of Blackboard, adding to the time they had already invested in developing their own courses.

> "...everyone keeps coming to me to ask me to explain Blackboard to them... and I don't really know very much about it myself... it's taking up a lot of my time, and I don't really know how I refer them on." (117-AC-FG).

Later in the implementation more courses and support became available so this was less of an issue. Nonetheless, VLE initiators in any department will be liable to this kind of pressure.

5.4.2 Teacher workload

This was thought to be a major issue – not necessarily made easier by using Blackboard.

> "...we've got 100 students and breaking it into 20 groups or 10 groups, I still haven't got the time required to look at each group... Blackboard I think is great if you are what it assumes that you are, that is a full time teacher, but we're all teachers, researchers, administrators..." (119-AC-FG).

> "...it has significantly increased my workload having these two VLEs and trying to keep them going. Because I think you do have to keep putting things up and they have to be constantly evolving in order for people to want to access them." (117-AC-FG).

It is possible that with more experience and knowledge of managing VLEs these teachers would realise some efficiency gains. Also, some have actually been using Blackboard specifically to *safeguard* staff time.

> "Well we started out with one very simple goal which was to get people to post their own lecture notes on the Web in a simple process that they could understand. This was specifically to save staff time, namely mine, because I was posting every single lecture note onto the Web myself." (409-AC-P2)

This demonstrates the utility of an easy to use VLE to pressurised departments. The additional work involved in creating more innovative or interactive e-learning tools, however, has inevitably been off-putting to most academics.

> "...for instance I'd like them to go to [from] putting a document up in Word which is easy to do, but taking it a step further and thinking about 'is that appropriate?'.

> Going from a document [that is] print orientated to what's on screen and the workload for that type of conversion is a lot of work. There's a lot of thought processes involved... so I still think people are thinking about work pressure issues." (221-SS-P2)

None of this is helped by the continual drive to increase research output and the related unwillingness to put significant effort into new teaching innovations.

> "I think it's getting worse actually... in particular I know people are actually given less teacher time... I've heard people say to me, well you know I'm being told that if I'm not publishing more research then I'm out and stuff like that." (403-SS-P2)

> "If you add up the kind of conservatives on the one hand and the difficulty of changing things on the other and then factor in the kind of lack of enthusiasm for technologically-based things, that don't obviously relate to what it is people are trying to do immediately in their teaching and research. Mostly people here have to realise they are entirely judged on their research assessment exercise on published material in journals and in books. They are not judged on or funded in terms of anything [laughs] to do with learning and teaching technologically based or otherwise." (409-AC-P2)

These represent important barriers to adoption of and innovation with VLEs.

5.4.3 Involving other staff

Attitudes to the involvement of staff varied, with some seeing Blackboard as a useful tool in improving communication between teachers.

> "...it's a way of drawing those tutors in a more interactive way with their tutees, than just seeing them once a fortnight maybe then forgetting about them." (515-AC-FG).

Others perceived a possible backlash from colleagues, however, echoing comments above regarding the poor regard innovation in teaching often received. There was also thought to be a lack of incentives for staff to get involved in e-learning.

> "Lack of an incentive for them to do it might be an obvious one and in relation to their workload. It's like an activation energy isn't it. They need to be able to see a clear benefit and I'm not sure that they do." (512-AC-P2)

> "...staff find it one more thing to do, one more thing to learn, they don't apply this as an interesting and creative wonderful experience and expansion of their teaching portfolio which is kind of a shame but it's my job to motivate them to see it that way." (409-AC-P1).

Some were optimistic about obtaining a 'critical mass' of colleagues using the technology

> "Once [staff] get familiar with using a web based management tool for their every day work then you know, I think it will be really quite useful" (307-AC-P1)

Others had taken steps toward this by making the VLE part of the teaching infrastructure of their course. This did not, however, result in across-the-board uptake by lecturers even after two years:

> "In terms of usage in general, it's very patchy and some people use it and use it regularly and put their material on. There are other people who don't use it at all... Two units use it very extensively." (515-AC-P2)

The slow uptake was blamed on concerns about copyright of materials and images from books needing to be posted on the system. Latterly, however, pressure has been exerted by students: "students are asking staff why [lecturers] haven't put material on Blackboard." (515-AC-P2).

The level of ICT knowledge and skill, and the time needed to develop additional skills was thought by some to be a barrier to involvement and a factor limiting the extent of innovation, or at least suggesting a stepwise approach to new technologies.

> "... we have all just discovered we can do PowerPoint slides now because they have gone and put PowerPoint in the lecture theatre which everyone is really enthusiastic about. So people are just getting to grips with that at the minute." (306-AC-P1).

When colleagues do get involved it might initially be to upload documents rather than innovative learning materials that would require much greater time investment and a steeper learning curve.

> "I think there will be a tendency simply to stock it with material, which is again pre-digested. I think it has the potential for interactive activities from the students but I think again that comes down to the teacher to be imaginative in terms of how they use it. At the moment it's easy just to give a lecture and then save the lecture to the Blackboard site and then it's there and, I think it's more the education of the teachers." (515-AC-P1).

Nevertheless, this seems to be how a lot of people started, and so might be a necessary stage before some staff become interested in other potentially more active tools such as online discussion. Early adopters and innovators would have an important role here, even if there is some way to go in changing perceptions of effective learning.

> "It is up to someone, usually in the department to set up that structure, it's usually done in a rather uninspiring way and usually done to sort of, I don't know, reproduce the chapters in the course handbook. And very often doesn't do anything except reproduce the course handbook, you know just a few documents in there which they've got in their course handbook, what is the point? And actually some of the members of staff believe that they have entered the 21st century by putting up a word document which is reproduced in the course handbook, you know, ***whereas the things that really do help learning, the things that will allow students to***

> ***communicate, they are seen to be things which could get out of hand which could start to soak up a lot of time and so if you don't know that its going to be manageable then best not to touch it***." (307-AC-P1, *emphasis added*).

Whilst this perhaps overlooks the evident usefulness to academics of having a central online store of learning materials, it does show the frustration of enthusiasts at the limited way in which Blackboard has been used on the whole. Moreover, attitudes to online learning systems were thought likely to be associated with more general attitudes towards teaching. Staff willing to innovate in their other teaching were thought to be more likely to experiment with novel online methods.

> "I'm not sure what kind of stimulates people to do that. It's interest I think. Because I don't think this is really about the VLE *per se* at all. I think it's about teaching. I think people who have a fairly fixed transmission based approach to teaching are going to do much more about providing lecture style etc., than people who are much more interested in communicating with students and self assessment ..." (403-SS-P2)

By the end of the study period, there was more confidence in the staff development and support systems introduced, but still an important barrier was seen as the lack of visible benefits and positive incentives.

> "I think the support is there, but there are many workshops and so on about using Blackboard as you know that happen every term at different levels and the courses, the workshops are excellent... ***if people had the basic incentives to use it then the support would be there I'm sure***." (512-AC-P2, *emphasis added*)

5.4.4 Managing expectations and supporting students

Technical problems when the service was first made available had been a problem. Breaks in service, for instance, can do a lot to dampen the enthusiasm of students.

> "They really liked having everything there, having one point to go to, it built up their enthusiasm. But when they found they couldn't access it off site, they bombed." (118-AC-FG).

Nevertheless, some students were quite fired up by using the system:

> "A couple of students have said to me even in week 3 'Will you be using this in the unit I'm doing with you next teaching block?' you know... so for some students it's really sparked them off." (116-AC-FG).

Staff really valued this kind of support from students and realised the importance of maintaining it. Initial training and ongoing support were seen as important in this process. Centralised training for students was not available but academics were

generally providing some support for students themselves and one was providing their own sessions to introduce Blackboard to students on their Units.

As well as comments about ensuring support for students, there was a sense that students are quite capable of finding out the basics of using VLEs when they know it is important.

> "I think today there is just students getting on with the job of acquiring this transferable skill and knowing that they have to do it" (409-AC-P1).

This and other comments implied that staff felt technical use of the system was relatively unproblematic and not a barrier to adoption by students. The main focus of this thesis is staff perceptions, however, and it is to their interpretations of the pedagogical aspects of using the VLE to which we turn in the next section.

5.5 Learning paradigm for teachers

In tune with the concept of a 'nursery slope', the introduction of Blackboard can be seen as facilitating potential changes educational practice.

> "We'd like to get the students to be more interactive in [their] learning, we've always pushed that for the last couple of years, and now we're trying to push it through VLE." (119-AC-FG).

As well as such opportunities for innovation, however, staff recognised the difficulty of thinking outside traditional ways of doing things.

> "Yes, I mean I think one of the really exciting things about learning technologies is the way in which they can act as catalysts for thinking about learning and teaching generally and I think that's really important... I think there's a real problem in that the majority of academics, you know, we've come up through the system by being taught through didactic approaches... I know I have that mind-set... its actually quite hard to get out of that mind-set..." (304-ST-P1)

> "...I think it provides a useful medium for doing things in different way and unfortunately there's rather a mindset with most teachers which is such that they don't tend to do things in a different way and therefore they don't use the full potential of the system..." (515-AC-P2)

Academics found it difficult to achieve the interaction to which they aspired by using Blackboard. There were various reported difficulties in involving students fully in online discussions. Some academics had adopted a strategy of prompting students with tasks and messages to encourage a greater response (see 5.5.1: Dialogue). Nonetheless, the time taken to moderate online discussions is a considerable

concern for staff – there is a fear that this is something that eats up time, in contrast to other features.

> "...staff are exploring opportunities to augment learning and save time. The virtual filing cabinet idea is made for that, as is the mailing cohorts of students' tool. The discussion board on the other hand is a recipe... is a potential time sink unless it's managed very carefully." (405-ST-P1)

Whilst this appears to have been true for the people in this study, these staff have not received any training in moderating discussion boards and so have been 'learning the hard way'. It was noticed by those running training workshops, however, that interacting with Blackboard enabled discussion amongst staff of important curriculum design issues.

> "...people are really talking about how they can integrate, how they can ease a face to face process that's not really working well. For example, a tutorial where people aren't submitting ideas for projects by a certain date and they're talking about how you know, using Blackboard facilitates the pre-discussion and post discussion and kind of enriching the process ..." (302-ST-P1).

Furthermore, engagement with interactive online functions was perceived to be linked with an enthusiasm for teaching more generally.

> "I think the ones who are using [discussion boards] well in that respect... I think they are people with an enthusiasm for the teaching." (220-SS-P2)

To analyse some of the ways in which academics were perceiving the learning process, the following four headings, taken from Coomey & Stephenson (2001), were used:

- Dialogue — *The extent to which understandings of topics can be explored and extended online.*
- Involvement — *The extent to which the VLE enables students to engage with the subject matter.*
- Support — *The extent to which the VLE facilitates learning and orientates students in this new setting.*
- Control — *The extent to which learners are able to choose the pace and nature of their learning.*

5.5.1 Dialogue

Teachers described finding or seeking opportunities to open a dialogue with students about the learning process. Sometimes this involved online discussions and sometimes a face-to-face dialogue.

> "...I think the students are a little bit surprised when you turn up at a class and you compliment one of them on getting a 100% in their quiz and they suddenly realise that you actually, although you've told them that obviously you can monitor their performance, and you can see they're slightly surprised that the link actually works. So, and I think they're favourably, rather favourably impressed by that and they take it all that bit more seriously. They realise that it does actually relate to what we do in the classroom as well." (310-AC-P1)

In this case it was a dialogue that changed the perception of students as to the utility of the Blackboard course, bringing it more into the centre of the learning process. Other opportunities revolved around teacher-directed tasks on the discussion boards.

> "The discussion board has been the most interactive... we also asked them to introduce themselves, and that was really effective, they all did it really quickly I think just to see how the whole thing worked. And then since then we've set these exercises at the end of a class like a tutorial question... and then we'll talk about it when we meet up next time." (118-AC-FG).

> "...I set a tutorial question every week on the discussion board and they have to answer it, well they're encouraged strongly to answer it. And the following week I review, you know, the answers and pick out one or two you know for special attention." (512-AC-FG).

These examples show the desire to link online learning with face-to-face learning through dialogue. The second academic was initially particularly keen to use Blackboard as a way to enhance learning.

> "...I think there is a great potential for VLEs simply to become some kind of substitute for dialogue. The face to face interaction, you know, especially if you start video streaming lectures and that sort of thing. So that gradually the VLE replaces that sense of dialogue. I wouldn't like to use it like that. I would like to use it to *extend dialogue*, I think that dialogue is essential for teaching and learning... I think that it can *extend the dialogue* through the use of the discussion boards and it can extend the potential for informed dialogue through providing resources for students, but I think that very much depends on how one uses Blackboard." (512-AC-P1, *emphasis added*).

It is interesting, however, to compare this quote with one from the same academic during Phase 2. The experience of using the communication tools seemed to frustrate the desire to use them for interactive dialogue supported learning. The desire is still there but limited by uncertainty about how to produce results and possibly by the design of the system itself.

> "I started using the discussion boards initially, but I found that... the return – given the amount of work that I was putting into it, having to maintain and monitor them, provide feedback – wasn't as great as perhaps it could be ...I think I'd like to experiment with that again to be honest ... if I set a tutorial question, which is how I used to use it, then typically two or three students would respond. Some would respond in some detail... if I got any additional responses then they wouldn't really be that much to write home about and unfortunately what I really wanted to do was open up dialogues between them, but I think one of the issues about Blackboard *in the way that it's designed and used* at the moment is that... they *don't seem to feel enabled or empowered* to use it in that way. Or maybe they just don't feel that it's a priority for them at the time." (512-AC-P2, *emphasis added*)

The evident frustration at trying hard yet failing to get the dialogue to work appears to be common according to observations of one of the support staff.

> "Yes I kind of feel that the least constructive, which is a bit strange, tends to be the use of the discussion board because it's been badly thought out. Because it's so easy to create one people latch onto it but they've never really thought the procedure out, so you get a lot of courses with them and they're least constructive because academics try them for a year and then become quite disenchanted with the whole process." (221-SS-P2)

These aspirations are echoed in comments about the difficulties of facilitating online discussions. Issues like these could explain the low (but now increasing) usage of the communication tools shown in Table 10.

5.5.2 Involvement

Academics were positive about the sorts of engagement the system could offer students within a busy timetable. They mainly cited ways of getting students to engage more fully with the course content, integrated alongside other teaching formats.

> "...they have a lecture where they have information thrown at them and we try some interaction at that stage and then in a practical bit they try and get their hands on and involved with the material, and then Blackboard I hope allows the opportunity for them to further reflect on the course so that they get involved in the discussion board and they can try out, sometimes if they, perhaps if they didn't understand something in one format, say the lecture or the practical, they could look into the external links and might see somebody else's way of presenting it. ...It offers them different opportunities to reflect on the material." (313-AC-P1)
>
> "I think probably the students might have a bit more thought on what questions they might have because a lot of the time you go to lectures and its just everything goes so fast." (306-AC-P1)

For these people, Blackboard is not seen as an adjunct but as an essential part of their courses. Looking toward the future, some had clear visions of the sorts of

activity that might be important in fostering involvement and engagement in learning through VLEs.

> "I mean how different it would be for example in education if instead of a standard 3000 word assignment which [our] students do there was a project where they had to utilise virtual learning resources where they had to for example, show evidence that they'd initiated a discussion around its key themes and involved, you know, relevant stake holders in that discussion, virtually, through the VLE. That they'd been able to pre-integrate different media elements into the presentation of their project, and that that was also a criterion for its success. I mean how different then would students attitudes be?" (512-AC-P1).

These quotes show great interest in facilitating engagement in the learning process and in using online tools to assist in this. Other comments, however, suggest such visions are not regularly being realised at present.

5.5.3 Support

This seems to have occurred through the provision of additional 'scaffolding' for students – providing online resources and perhaps links to other materials and sites. Academics also discussed the opportunity Blackboard provided to introduce lower level knowledge to students. Support for higher level understanding was often limited, however.

> "...it's enabled us to, to flag up certain basic knowledge which we think students ought to have and yes ... [but] in terms of intellectual development it's the *very basic level* because the sort of intellectual skills we would expect students to develop even in their first year are *beyond the capacity of any electronic system to monitor or to assess*." (310-AC-P1, *emphasis added*)

The academic attempts to provide structures to help students to move from their current understandings to a point nearer the teacher's understanding of the topic. This can include documents but more importantly feedback. This might be provided directly or via formative assessments, as here:

> "...students do find it difficult having a feel for the boundaries... they need to reach and certainly I hope to both provide guidance through the system but also to make use of the assessment components within it to guide students in terms of their giving informative feedback in a very simple and easy way. And practice in relationship to our exams." (515-AC-P1).

> "...there's one chap in music... He seems to have used it in a very intelligent way in that he integrates it very much with the seminars they have face to face and he gets a very good response between the seminars because it's following on from the themes of the seminars and they pick it up again at the next seminar, so that works well." (220-SS-P2)

Such fully integrated learning support was rarely reported however and may not be the norm. A more common experience appears to be the provision of online content, perhaps with a discussion board, but with less direct intervention from academics.

5.5.4 Control

Using VLEs can be one strategy for enabling students to find ways of learning that suit them best.

> "...they can do it whenever they want... they can plan it into their timetable and they might choose say to do the quiz immediately after the lecture or they might choose to wait until they have revised it. If you are the sort of person for whom you come to the end of the lecture and you can't really remember any of it, they need to go away and read it a bit and think about it a bit and do a bit of background reading before getting to grips with it." (306-AC-P1).

This reflects an appreciation of differences in learning style that can exist in any learner population. It was also seen that there is more expectation amongst learners that a larger proportion of their learning activity will be focussed on the Web, reinforcing evidence from the literature on the increasing dominance of IT and Internet technologies in Western culture.

> "It is part, I think, of a general process whereby students begin to think more spontaneously of looking to the Web for resources. So I wouldn't say you could, you could say that Blackboard has directly contributed to this because we do a number of things in Web-based resources as well apart from Blackboard." (310-AC-P1).

Perhaps the most important aspect of this control of learning is the opposite of this – "voting with their feet". If learners perceive limited value in online resources/activities there will be low usage of them and hence no way to use the VLE to effect enhancements in learning.

> "These things only support learning if the students use them. And if the students find that there is only very small parts of the course that are covered... by a Blackboard course then you know, they probably won't want to spend the time learning how to operate it for you know, for a 3 week period... students are quite savvy about these kind of things, it's only when they can see the real benefit that they are going to do it... as it is now I think their coverage is just too bitty." (307-AC-P1).

So whilst students are being offered new ways of accessing and engaging with material, and are more used to finding it on the Web, the patchy uptake of Blackboard by academics and the way it is being used may be inhibiting wider usage.

5.6 Technology related

Although a large number of passages were coded as relating to technology issues, in the main these boil down to three important issues relevant to the current study: enrolment of students, site management and data integration and representation.

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5.6.1 Enrolment of students

Getting users enrolled onto courses was known to be a problematic part of the Blackboard implementation and despite the significant progress made in this area, staff found it to be a barrier.

> "...the registration process is very cumbersome, and inconvenient, its time consuming, it's difficult for the students to manage..." (512-AC-P1)

Some resorted to using self-enrolment as a solution to the lack of support for automating this both within Blackboard and within the institution. By the end of the current study, facilities for automated registration and batch enrolment on Blackboard courses were in place. Enrolment was, however, clearly an issue during the study.

5.6.2 Site Management

The administration tools were found, on the whole, to be cumbersome and unintuitive. One of the most prominent issues has been the inability to 'move' files and folders from one place to another as one would in familiar tools like Windows Explorer [43]. Instead this necessitates deleting the file or folder and uploading or creating it again in the new position – universally thought to be clumsy and time consuming.

> "...you've got a structure up there, say you're putting up external links and I've put up folders for the Web site, but if you then want to change that and move it around and put it in a different place you can't do it ... you can't alter it once it's there apart from taking it all down again and putting it all up again..." (117-AC-FG).

> "I found it a clumsy tool to manage, I wish that there was something like 'Windows Explorer' type of features where you could create new files, move files around with much greater ease... if you mess up then you often have to go back, almost to the beginning... I find that quite time consuming and clumsy." (512-AC-P1).

The management and user interfaces used to manage and display Blackboard were thus a cause of some frustration amongst the academics.

5.6.3 Data integration and representation

The way Blackboard is structured around courses makes it difficult to introduce the concept of hierarchical programme structures (Elements within Units within Programmes and so on, see also 5.8.1). This is partly due to the lack of data integration and accuracy across systems.

> "...it has highlighted to me that the idea of an assessment Unit in a University does not map on to necessarily what people teach on the ground, so that the data that's actually in the [database] does not reflect what we want on our learning environment in terms of the structure..." (301-SS- P1)

The fact that there was no two-way link between information already held about units, students or staff meant that information had to be entered fresh onto Blackboard each time, adding an extra time burden. This produced additional difficulties for programmes made up of several course units as it was difficult to represent programme level information without major duplication of effort.

5.7 Implementation related

5.7.1 Staff development

Some respondents were anxious that the training and support issues were large and not yet appreciated by the institution, partly due to a generalised lack of expertise in the best ways to use VLEs.

> "I think staff development issues are quite huge because I don't think we yet know enough about what is good pedagogical practice... you need more learning technologists to actually help work with people in terms of finding out how you can use these things...I mean ideally, I mean I think ten-fold, I mean it needs to be a huge increase...." (304-ST-P1)

Academics also found it difficult to imagine best practice in the absence of exemplars and might tend to rely on more familiar resources.

> "...the training and support is a little difficult until there are some really good examples, using the software that you've got available so that people can see how to apply new technologies, because very often what people tend to do is reproduce

> something that they would do on paper and you've got to think a little bit out of the box very often with these things." (307-AC-P1)

The nature of academics was perceived to be important in determining the formats for development – using such positive exemplars rather than workshops – in that staff could work out most features given the right information and a reason to do it.

> "I'm slightly averse to dragooning people into attending training courses. I think they need opportunities to see what's available, but these are very intelligent people I think... they need exposing to the possibilities and that can happen in 5 minutes or 15 minutes... they're highly qualified problem solvers in general, they can read a manual and make it work. And so I think what we need is not lots and lots of training courses but lots and lots of support in a multiplicity of ways... it's a sort of marketing challenge really. It's how to get busy people with other priorities hooked onto your product." (405-ST-P1)

This finding relates closely to the observations of academics on the heavy workload and competing priorities existing for most staff (see 5.4).

5.7.2 Bespoke vs. commercial VMLE product

This was a decision yet to be made and has many complex aspects to it. The comments on this subject are therefore also complex to analyse since the interviewees were often trying to weigh up the pros and cons in their head as they were speaking.

Some felt that the main features of commercial VLEs like Blackboard were easily reproducible with other existing software (except for student activity tracking).

> "I don't see personally what's particularly attractive or defensible about Blackboard other than a sort of cosmetic aspect.... I see it as rather trivial to be able to reproduce the screen functionality of Blackboard-like things" (405-ST-P1).

When the above view was put to one of the academics interviewed, they could see the point but still felt there was some other added value from having a 'VLE package' of some sort.

> "...I think that misses the point really in that, you know... VLEs I think are very much part of the future, I think what those sorts of views miss is the potential for extending teaching and learning. But that requires as we've been saying, you know, more than just using it as it is at the moment, it means a more sort of ***root and branch re-appraisal of how as a University we make use of virtual learning environments***." (512-AC-P1, emphasis added).

Since a commercial system is in place, people using it have become familiar with the sophistications of (some of) its tools and interface (albeit with the problems

noted above). They are finding the current system useful and appreciate the work involved in creating a more tailor made system.

> "...if one had a more tailor-made system, that might be ideal but again it's a matter of whether something can be made sophisticated enough..." (515-AC-P1)

This was also picked up on by someone within the Support Staff in terms of the problems facing developers of a bespoke system.

> "Blackboard is certainly feature-rich, and it would be very hard and actually very foolish to try and reproduce that range of functionality separately. I think there's two options in terms of making it visible via the Portal. Either we persevere with our Blackboard path, and we get ourselves... into an environment which is more open and more customisable and has better interfaces, which then allows us to embed bits of Blackboard into an overarching Portal. Or we pull the plug on the Blackboard development because actually somebody, perhaps you, tells us that actually 85% of staff and students, right now anyway, all they need is a virtual filing cabinet, a mailing tool, a discussion board and something for delivering assessment or quizzes. Now I can see the risk there in that that's potentially a very sort of blinkered approach because arguably if you let Blackboard tick over in this sort of subliminal way for a couple more years it's likely that people are going to bump into some of the other features, and the environment may change in terms of the external environment and perhaps some of the more distance rather distributed components of learning tools within Blackboard will have more value in the future. And if we as it were bailed out of Blackboard then the nursery slope won't be there for those things. So it's a tough call. ... But to go for the full Blackboard learning system is only [double the] price that we're paying now, £32K a year rather than £16K a year. It's pretty small beer. Now that's not the total cost of ownership but it would buy us a bit of time, it would allow us to evaluate the more open version of Blackboard..." (405-ST-P1).

Interestingly, a more negative view of Blackboard was produced in a later interview with this individual, who had come to see it as a collection easily replaceable of tools.

> "...Blackboard has just got chunks of functionality like upload document, discussion board, digital drop box and they are given natty names that makes them sound exciting, but they're actually bog standard bits of Web applications that we've got in multiple places, multiple times." (405-ST-P2).

Others would appear supportive of a bespoke solution despite having invested time in using Blackboard. Most would be happier with a system with improved automation of enrolment through integration with student data and other systems.

> "...on the one hand initially it sounded silly to me trying to build something – on the other hand having seen the limitations that are built into this particular version of Blackboard and the way that it's technologically it's quite difficult to integrate with the existing systems and we have enough duplicated systems already." (409-AC-P1).

The 'Nursery Slope' or 'Suck it and see' approach has been very valuable in this respect. It has enabled many people to start using a VLE. There remained mixed views on which solution might be the right one in the end.

> "...developing our own. Is that really cost effective? ...I think it's a very difficult decision to make because I'm not all convinced that carrying on with Blackboard is the right solution, but I'm fairly convinced that trying to develop our own is the wrong solution." (403-SS-P1)

> "[Blackboard is] far from meeting everybody's needs at the moment and you know, I can see how a bespoke system [could be]... more relevant for individual departments and I think it is... a fundamental strategic decision is the nature and the level of the integration with the administrative tools... to create a genuinely managed learning environment..." (512-AC-P1)

5.8 Institutional issues

5.8.1 Choice of Blackboard and institution-centrism

At the institutional level, the main reason for adoption of Blackboard appears to have been 'ease of use' for staff.

> "So why we decided to recommend it I think maybe is that we felt that it was easy to use" (403-SS-P1)

> "I think they chose it because it was easy to use and its, on that basis it's worthwhile because I think people can pick up on it very quickly." (301-SS-P1)

The use made of the system and the comments relating to the ease of uploading materials suggest this was a correct assumption. Some aspects of the interface might also be appealing. Blackboard is organised around the concept of the 'course'. The advantage of this is that each teacher has a special area to develop for their own purposes and students can come to recognise it as a protected environment.

> "...some people refer to a VLE as a walled garden which I think it a very nice metaphor really because it's the idea of really being the sort of container and makes it sort of safe. The walled garden is where you might put your children to play in and not have to worry about them." (403-SS-P2)

The disadvantage is that different levels of a programme of study are harder to represent. Course units are normally part of a larger programme and may also have smaller elements within them. Supra-course information[44] is difficult to include, necessitating either uploading into every course unit or placed in a separate 'super'-course (both cumbersome manual tasks). Blackboard did not, therefore, easily mirror the academic system at the institution.

> "...there is no way that for example, as a programme director I could put... programme specific information across all of the units." (512-AC-P1).

> "...ideally it is a teacher communicating with their group of students and at the basic level it's great like that and it should be very unique and individual at that level. But

> then there's a sort of hierarchical level of maybe a programme structure which at the moment probably doesn't apply to some of the ways it's being used." (515-AC-FG).
>
> "...the concept that what people want is not, not this idea for [a] Blackboard course but much, something with much more granularity from the programme down to the tutor group... We haven't found a way to make Blackboard support it and give that picture." (301-SS-P1)

What the VLE provides is a 'common look-and-feel' – consistent, recognisable structures and navigation icons. This led to some concerns, however, about a tendency towards central control, overriding the needs of local users, and of having little to distinguish it from other Blackboard environments.

> "I don't know exactly what my concern is here, but it's very institution-centric... We teach part-time mature students, and really our little course is... the centre of their academic universe, and not the University of Bristol." (118-AC-FG).

Others cited deeper concerns about embedded assumptions.

> "I worry that maybe what we'll get is... hegemony in terms of you know, standardisation... an Americanisation and 'instructionalisation' of our course and that does worry me." (304-ST- P1).

Thus there is perhaps an anxiety that institutionalised screen layouts would restrict academic freedom or creativity and so get in the way of the teaching and learning process. On the other hand, standardised navigational structures presumably contribute significantly to the ease of use referred to as a rationale for choosing Blackboard.

5.8.2 Two Tribes: conflicting perspectives of teachers and computing staff

There were various advantages and disadvantages voiced to both the commercial Blackboard system and a potential home-grown alternative, but certain perspectives tended to be held more by some than others. It became apparent that two "tribes" existed, each with differing, sometimes conflicting, views of the VLE:

a) "Teachers" (perspectives expressed mainly but not exclusively by academics) – requiring expedient solutions to deliver teaching, tending to prefer commercial software that could be used 'off the shelf'.

b) "Computing staff" (perspectives expressed mainly but not exclusively by support staff and strategic commentators) – aiming for properly integrated institution-wide systems, tending to prefer in-house development and control of applications using open-source[45] programming tools.

The support staff often found themselves brokering between these extremes – feeling the need to support teaching staff in the short term yet aware of the longer term ambitions of their colleagues in the computing services.

> "...teachers want to put materials up tomorrow, and they come to us with materials... from the teacher's perspective... they need to do something now and it works, and if there's an open source solution now you'd take that, but there isn't so we are kind of doing something now which I think scares the people who want the open source solution because they're worried it's going to displace the open source solution. ...I think one of the things I've noticed with the different factions here... is they are just coming from different angles really..." (220-SS-P2)

Support service staff have thus been enabling academics to meet their learning technology needs using commercially available software offering immediate solutions. Conversely, some with a strategic role in the computing services seem sure about Blackboard's future in terms of the inability to adapt and integrate it with other university systems.

> "I think Blackboard has served its purpose. It provided a nursery slope. We've now found the limits of the nursery slope. People who have skied on that nursery slope now aspire to more exciting gradients and Blackboard can't provide that and so it's been useful I think as an evolutionary step. But, I think it's becoming abundantly clear that Blackboard is not rocket science, that it replicates a lot of functionality that is found in other systems we already have and that it is monolithic and not something that we can cherry pick from and use in the way that we wish." (405-ST-P2)

Both perspectives reflect important issues: easy to use and immediate solutions versus solutions that will take longer to develop yet be more sustainable in the longer term. The conflict between them is apparent.

> "The problem is that everybody has got valid points of view really. It's just that they have a different perspective and a different set of priorities. I kind of feel that there is a bit of a messianic thing about open source and all that sort of thing, [and] I tend to take a more pragmatic view." (403-SS-P2)
>
> "I think they are both practical it's just looking at the problem from different angles." (220-SS-P2)

Nevertheless, teamwork (and management support) has been possible and essential to furthering understanding of possible next steps.

> "In one sense we are working together better than we've previously been... we are definitely pulling things together now because... we've got our own dedicated Blackboard support technical team... we've got that join now which is really useful, and that the upper level is fully committed to the idea." (221-SS-P2)

From this it seems the support and computing staff may have been on their own 'nursery slope', and conflicting perspectives have been useful in learning about VLEs and what is needed from them and beginning to formulate future solutions.

5.9 Policy and Strategy

The central importance of strategic direction was recognised by participants and the lack of it was mentioned as an important barrier to innovation and implementation. The university did act strategically to support the purchase of Blackboard and the development of the new "Portal" site. Nonetheless there was an early apprehension that this strategy was not as coherent as it might have been. Those with a strategic role appeared anxious about a lack of direction, both locally and nationally.

> "What worries me more is not the effort that's going on at an individual level but the collective thinking of the institution and its planning, it's all too ad hoc for my liking." (405-ST-P1)

> "Strategy is crucial to get this to work... a clear and coherent strategy... and the problem is that in institutions, there is no coherent set of strategies." (304-ST-P1)

There was a feeling that people were being asked to invest time in something that was not guaranteed to be there in a few years time. There was a sense of time running out owing to the pilot nature of the Blackboard installation.

> "...we need to make that decision [what to do about Blackboard] really quickly because we only have the licence until December 2003[46]. It's really not worth people's time and effort to actually use it unless we know we're going to have it for a considerable length of time..." (302-ST-P1)

Yet even late on in this study, academics sensed a lack of leadership and were voicing a lack of confidence in the computing services to deliver suitable solutions.

> "It singularly lacks strategic leadership, this area, which is a real shame. It's like many other fields within this University, and this School, but it lacks a coherent strategy and the necessary leadership and incentives to get the whole thing going." (512-AC-P2)

> "...from being [here] for 30 years, [staff] see many ideas come and go and many sort of local initiatives go off completely half-cocked because the University doesn't embrace them totally... [or] think they can do something totally wonderful and not actually talk to other people who are doing these things and we have seen many initiatives like this where we've ended up with a less than satisfactory end result... if it is going to happen, it has to be sophisticated, properly funded and totally embraced." (515-AC-P2)

And yet there was a strong sense that all of the relevant pieces of the jigsaw were already available internally but not yet joined up or integrated.

> "...that's the issue with Blackboard isn't it... all the specific tools that Blackboard offers – we have specialist ones that do the job much better and it's going to be well how does it fit, how doesn't it fit, where is the University vision for the next three years." (221-SS-P2)

Therefore the nursery slope policy may have paid dividends in getting people to use a VLE, but staff are anxious that lessons learned from this pilot are quickly converted into a firm and long term strategy for e-learning support and development.

5.10 Chapter summary

This chapter has examined the qualitative data for explanations of how Blackboard is perceived and used. The system was chosen because of its ease of use for academics, who did indeed like the easy upload features and 'one-stop-shop' aspect of being able to put all resources and links for a course in one place. This saved much time and ensured the materials were available for students and other staff with minimal effort provided at least one teacher was willing to do the uploading.

Communication tools, specifically the discussion boards, were greeted with some interest but ultimately those who did use them became somewhat disillusioned. They found it too difficult to encourage sufficient participation in online discussions or facilitate collaborative learning as some had hoped. Support staff commented on the ineffectiveness of many of the discussion boards created. Important determinants are lack of staff time and training in online teaching techniques.

The available assessment tools were felt inappropriate for some subject areas and large class sizes inhibited lecturers from using the tools, even where the topic leant itself to this sort of test. One academic had nonetheless had a positive experience of using an online formative assessment to encourage students to think about their answers more. Possibly the large relative increase in assessment tool use (see Chapter 4) represents increasing experimentation with this feature, but it seems likely that it will remain a subsidiary function for the immediate future.

Comments on the other tools (virtual classroom and 'drop-box' tools, group and student areas) corroborated the usage data showing that these were accessed much less than content and communication tools. Academics seem to have found these features difficult, unclear or clumsy and none of those interviewed had found a compelling enough reason to use them.

The Blackboard installation was perceived as a "nursery slope"– facilitating exploration of online learning environments. The data support this notion to an extent, with support staff and academics commenting on examples of

experimentation and insightful visions of how the system could enhance education. Nevertheless, 'limited pragmatic utilisation' has characterised uptake of the system – academics using specific features for specific expedient purposes. Support staff interviews revealed some disappointment at the lack of significant educational innovation. This can be linked to comments reporting:

- Lack of time for academics to invest in developing online teaching;
- Pressures to conduct research rather than teaching;
- Isolation of innovative staff who do experiment with Blackboard;
- Technological barriers including problems with student enrolment and clumsy site management tools;
- Lack of strategic vision and support for online learning.

In addition to concerns over the lack of strategy there appears to have been two main conflicting views of VLE development. One, tending to be held by academics, focussed on expediency – having a system that would enable them to use online learning right now. The other, tending to be held by support services staff in particular those in the computing services, focussed on sustainability – ensuring that any VLE would be compatible with other systems and sustainable (normally allied ideal 'open source' rather than a commercial platforms).

In the next chapter, these and other issues arising from the data will be discussed in relation to relevant possible explanations from the literature.

Chapter 6: Discussion of Results

6.1 Blackboard usage

A substantial increase in uptake of Blackboard between 2001/2 and 2002/3 was observed. Access levels were however very similar and in fact slightly lower for 2003/4. Nationally there has also been a dramatic increase in the use of VLEs in higher education (Browne & Jenkins, 2003) due to an increased interest, higher profile and greater ease of use of such systems. There was, however, a drop in student use in year 3. Possibly a saturation point was reached either in the number of academics recruited to run courses or in the utility of these courses to students or perhaps both. Technical issues such as the difficulties with student enrolment may also have played a part in discouraging uptake.

Most activity is focussed during term time, but vacation usage shows a "U"-shaped pattern (**Error! Reference source not found.**, Figure 27). This could mean that students are downloading files and information in the first week of the vacations and in the last week of vacation. It could be access from home although it is not possible to tell from this data. It is also possible that staff were continuing to update their courses when students have gone home. Whichever of these factors is the greatest contributor, the fact remains that support and maintenance of Blackboard (or a teaching portal) needs to be continuous through vacations as well as term time. This correlates with the results of a study of Blackboard use at the University of Durham (University of Durham, 2004), in which 59.6% of students in 2001 (n=793) responded that they had accessed the site from Residence/Home out of term time.

The quantitative and qualitative data both confirm the most prominent uses of Blackboard to be the storage of content and the provision of communication tools. The overall pattern was relatively stable across years 2 and 3. This data is similar to the results of the Durham survey (University of Durham, 2004). For both Instructors and students at Bristol the pattern seems to be the same. The heaviest use was made of Content Areas, followed by Communication Areas, then Student Areas and

finally Group areas. During the first year after installation there was a higher proportion of administrative use, as might be expected if tutors are setting up courses and experimenting with the system. Each type of use will now be considered in detail.

6.1.1 Content tools

When uploading content, academics found the "one-stop-shop" function of having their materials in one place one of the most useful things about the system. The evidence is that accesses are mostly non-administrative (i.e. students downloading content) in years 2 and 3 (Figure 32, p86). This "virtual filing cabinet" function seems to have been important as a repository not only for students but also fellow academics, yet is seen by support staff as a limited or even unimaginative use of Blackboard. Academics and support staff agreed that this functionality could easily be provided by some other means such as an intranet, but Blackboard made it easy to upload files without detailed technical knowledge, and had communication and other tools available in one place.

Support staff felt there was much more which could be done with the system educationally. In particular it was felt that simply using Blackboard as a 'holding space' for course documents was not making best use of the medium. In discussing better uses, these subjects felt that more effective use of online discussion and collaboration tools was a high priority. This resonates with literature emphasising the fact that higher education is about more than 'knowledge delivery' (Brown & Duguid, 1995). It also shows the gap between what support staff know to be possible with VLE technologies and what they are being used for. It should be noted however how large a number of people are now using Blackboard for 'limited' (Ryan et al., 2000) but to them very useful functions (Stiles, 2000; Stiles, 2002; Laurillard, 2002)

6.1.2 Communication tools

The next most popular feature was the communication tools, for which 24.1%[47] of the activity involved sending emails and 73.4% was discussion board activity. The former was highlighted as a very useful feature not provided by other software.

Discussion boards were of interest to academics wanting to use them to extend learning. Some of those who experimented with it were later disappointed, however, by the lack of success they achieved in encouraging collaborative learning. Support staff echoed the difficulties they had seen academics having engaging with the new skills involved in managing productive discussion boards. This is probably linked with the observation that such tools are potential "time sinks" requiring significant input from academics to maintain. Certainly academics did not generally create group areas, finding it too time consuming to enrol students.[48]

Posting an email to a discussion board, whilst a simple and apparently informal task, in fact carries with it a sense of formality (Crook & Light, 2002), and also entails a visible archiving of messages. This is incongruent with the supposed informality. It is likely that learning the skills of an e-moderator (Salmon, 2000a; 2002) would enable academics to facilitate online discussion in ways they had been anticipating and help students engage with this medium. There were various comments alluding to the anticipated benefit of the communication tools for collaborative learning. Academics are unable to capitalise on these due to lack of time, knowledge and skill.

6.1.3 Assessment tools

The very low (but increasing) use of assessment tools seems to have been due both to lack of staff time to set them up and staff concerns about using them. Important concerns included the assessment tools' unsuitability for the academics' own subject, security implications and the sheer number of students requiring assessment. This is echoed in another study where 29% of staff believed Blackboard assessment tools to have limited utility (Connor & Bird, 2003). Such concerns might apply to summative more than formative assessment. Indeed, where formative assessment was being used learning gains were reported in the current study.

Probably online assessment has not yet become a mature technology or captured the imagination at the institution, where there are also other systems being trialled alongside Blackboard.[49] It also seems to have been a much lower priority for academics than other tools until very recently.

Nonetheless, assessment tool use showed the largest relative increase between years 2 and 3, and this is non-administrative use (Figure 32, p86), so possibly the Nursery slope concept is bearing fruit here with academics experimenting with functions other than those of initial interest. It would be interesting to see whether the increase in assessment tool use continues into the 2004/5 academic session.

6.1.4 Administration tools

Administrative use was highest in term 1 (especially October) for all 3 years, suggesting that much of the input of academics is focussed on setting up materials and initiating discussions at the start of the academic year. It is also possible that the large number of administrative accesses is related to the "clumsy" site management tools discussed in the interviews, requiring perhaps more clicks than expected to accomplish certain tasks.

6.1.5 Group and Student areas

The minimal use of these tools appears to be due to lack of any real or perceived need for their functionality. In the case of group areas, the tools for administering them were also seen as clumsy and time consuming, particularly in regard to managing the lists of participating students. As one interviewee pointed out, it may also be due to lack of a culture of collaborative learning in higher education.

6.2 The use of Blackboard features

Therefore a subset of features of most immediate use to staff have been adopted so far. This echoes the findings of others implementing VLEs.

> "While WebCT has proved itself to be very satisfactory – we have not yet fully exploited the facilities we required. For most authors, the only work absolutely requiring the online use of WebCT were asynchronous discussions... and... an automated test ...to assist tutors to monitor students" (Woodman et al., 2001:157).

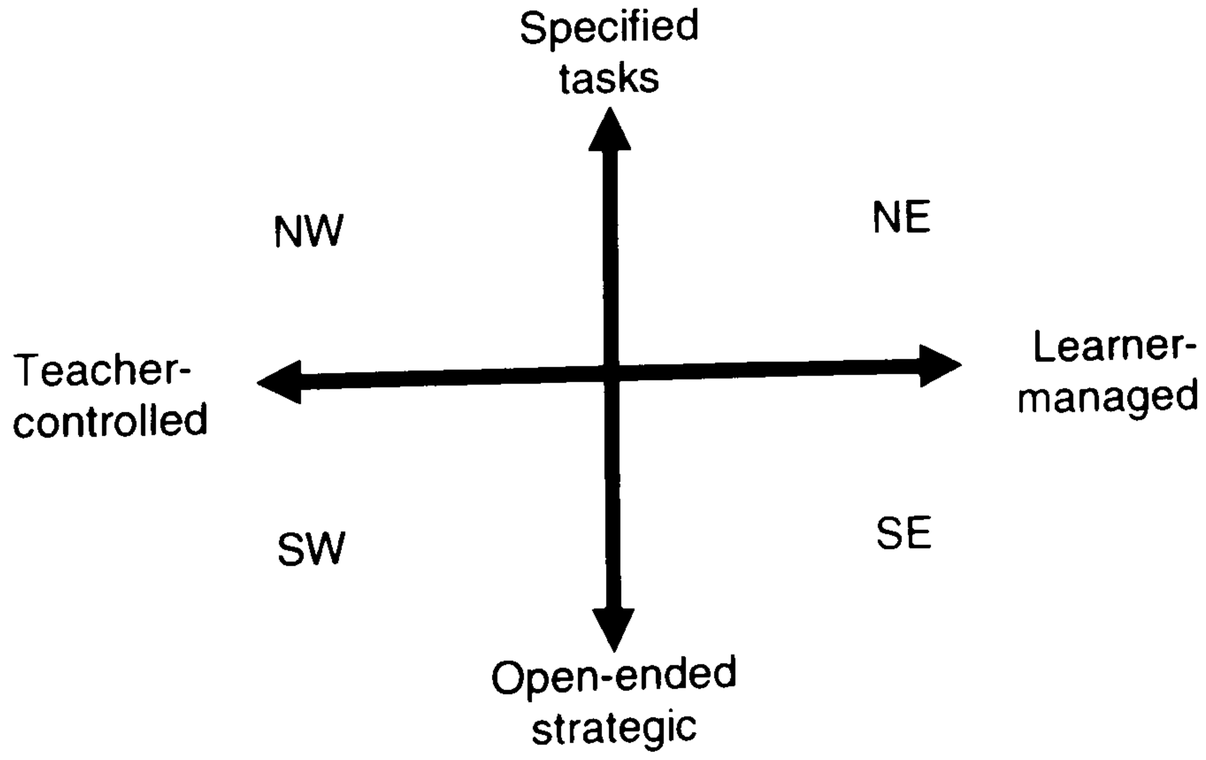
Work at Durham University (University of Durham, 2004) showed a similar usage pattern from 2001 to 2004, and also that the majority of students perceived tools like discussion boards to have had little effect on learning (70.6% in 2004 stating it had

"no impact" on their learning). This might be due to ineffective discussion board management by lecturers. On the other hand, 83.8% of all students polled stated that lecture materials on the Blackboard environment had "some enhancement" or a "major enhancement" effect on their learning. Responding students (in 2004 but not previously) also agreed that the system introduced organisation to lectures and their notes and helped them prepare for lectures and examinations. Possibly academics are correct to focus on the upload and organisation of content, as this seems to meet a need with students as well as saving staff time. Comments from interviewees in the current study, however, pointed to the dangers in providing only a restricted resource to learners: "These things only support learning if the students use them... it's only when they can see the real benefit that they are going to do it" (307-AC-P1). The Connor & Bird (2003) survey also mirrored the low level use of other tools such as the Virtual Classroom and Digital Drop Box, which do seem difficult and non-intuitive to use, as seen elsewhere (Carton et al., 2002).

6.3 Pedagogical issues

Academics have described various ways in which they have attempted to use Blackboard to help them engage in dialogue with students, provide support and opportunities for involvement in the material and control in students' learning. Despite this, the use made of Blackboard would seem to show a tendency towards teacher-controlled, pre-specified tasks (Figure 35) – focused on uploaded content and pre-specified discussion tasks. Literature on online learning, however, suggests that effective (and also time- and resource-efficient) VLEs need to emphasise learner-managed or open-ended activities as much if not more than teacher-controlled tasks (Coomey & Stephenson, 2001).

Figure 35: Online learning paradigm grid (Coomey & Stephenson, 2001)



There has also been an emphasis on the **acquisition** mode of learning with **participation** emerging in courses making more use of discussion tools. This is perhaps largely because academics are placing materials online for download from a 'one-stop shop' – presupposing a more passive, 'information-push' mentality. The interview data, however, show that several staff are very much aware of the benefit of **participation** to the learning process, but have been disappointed by a lack of success in this arena. Also, the Acquisition/Participation balance depends on the nature of the subject area and the emerging online skills of teachers and learners (Collis & Moonen, 2001).

The lack of training and support that staff have obtained in 'online pedagogy' is evident from the 'trial-and-error' learning that has characterised development of sites, particularly in regard to facilitation of online discussions. Whilst good courses and support are now more readily available, it seems that workload and strategic support (see below) are important determinants of the uptake of staff development and of further experimentation with the VLE. Equally, both staff and students need to be learning together how to use VLEs most effectively. This might be best achieved using a team based approach to staff development, as suggested elsewhere (Shephard, 2004).

6.4 Learning paradigm

These pedagogical issues lead to a consideration of whether a particular 'learning paradigm' exists for staff responding in this study. A learning paradigm is defined here as ***the general approach taken (consciously or unconsciously) in supporting student learning***. Notwithstanding the fact that some academics did experiment with collaborative learning, the main thrust of their efforts and of most observed activity has been in the provision of online content. Support staff tended to follow the optimism of the literature in emphasising the importance of collaborative tools. They expressed disappointment where academics found it difficult to use such tools or preferred a content-oriented approach. A lack of strategic direction as to a preferred approach was also evident (see also 6.9). The limited time available to academics to develop online learning has also inhibited more labour intensive modes such as collaboration and interactive learning. Taking

these data together it can be surmised that the institution as a whole tends towards a content-driven learning paradigm, at least by default.

The University of Durham Blackboard study also reports a content driven approach (University of Durham, 2004). Yet the literature promotes VLEs as an opportunity for enabling active and collaborative learning, perhaps in part due to hitherto unquestioned assumptions that computers are generally beneficial to learning (Barnes, 2000). Some write that content-oriented provision suggests a lower quality learning experience (Ryan et al., 2000). Others comment that VLEs too often enable academics simply to reproduce existing materials and methods on the Web, that ignoring the social processes of learning creates a less than engaging experience for the student (Stiles, 2000; Stiles, 2002), and that effective VLEs need to promote active, rather than passive, learning (Richardson & Turner, 2000).

6.5 Blackboard as a 'Nursery Slope'

The "limited pragmatic utilisation" of Blackboard (academics adopting it for specific purposes but not venturing much further) observed in this study both confirms and yet is at odds with the notion of a 'Nursery Slope' floated as a rationale for its initial installation. Blackboard was chosen as 'off-the-shelf' software that would be easy to use by academics without much technical training, and this appears to have been the case. The existence of nearly 300 active courses indicates the extent to which academics have started to use the software. The 'Nursery Slope' concept was that having begun to use the system for simple tasks, academics would then start to experiment with other features. Whilst this could well be the case in some of the many courses now active (286 for years 2 and 3), and in relation to assessment (see 6.1.3), the general picture is one of conservatism, as noted elsewhere (Stiles, 2002). This is probably a common phenomenon:

> "Human beings usually use computers not because they want to interact with them but because they want to reach their goals beyond the situation of the 'dialogue' with the computer" (Kaptelinin, 1996a:49).
>
> "We tend to use objects in ways suggested by the most salient perceived affordances, not in ways that are difficult to discover (Norman & Dunaeff, 1994:106)

Teachers can be reluctant, or may not see the need to change their teaching. In one survey 69.2% of staff responding in 2001 and 80.0% in 2003 stated that "my basic approach to teaching has not changed, but [Blackboard] helps". However,

2004 was the first time that some (6.4%) chose the option "my teaching practice has changed considerably" (University of Durham, 2004). So perhaps continued exposure will provide opportunities for change.

Academics need to think 'outside the box' of more familiar methods to enable effective and enhanced learning online, and support staff were keen for them to do so. Some academics had insightful visions of how a VLE might change and enhance learning, but they all struggled to make this a reality and struggled particularly with online discussion and collaboration. In fact the overall picture of Blackboard use does not reflect the vision commonly seen in the literature:

> "It is argued that the focus on online learning activities found in distributed learning institutions is most compatible with a model of pedagogy that emphasizes, among other things, asynchronous small group discussions, collaborative problem solving, reflective inquiry, competency-based outcomes, and the facilitator role of the instructor." (Rudestam, 2004)

Much of this can be attributed to workload and the pressure to expend energies on research at the expense of teaching. This was specifically mentioned by various interview subjects. Some felt that engaging in the more interactive features (discussion board) was something of a "time-sink", taking up additional hours they did not have. In addition there was evidence that those who did initiate the use of Blackboard appear to have felt marginalised and isolated. Not only were they taking on additional workload, but they tended also to become 'de-facto gurus' assisting others in using Blackboard, at least in the early stages before more formal staff development became available.

Many felt there was a lack of incentive to get involved. Even if it was departmental policy to use Blackboard there was a lack of time for academics to create online materials and courses. The lack of time and expertise for accomplishing seemingly simple administrative tasks such as enrolling students on the courses was particularly felt, even resented, within departments. It is important, however, that academics are encouraged and supported in using VLEs because of the pivotal role they can play in effective technology use (Lim & Barnes, 2002).

Teacher perceptions of VLEs and their reasons for using them are under-researched topics, but there is consensus that technology should *enhance* acts of teaching in higher education (Browne & Jenkins, 2003) and also some evidence that teachers do use it to improve student learning and enhance teaching, even if it means extra work for them (Myers et al., 2004). The extra developmental and

administrative workload is not to be underestimated, and can add significantly to working hours, although the end result might be considered worth this investment (McInnis, 2002).

6.6 Affordances and future use of Blackboard

The extent to which functions of any system are obvious, and the mapping between perceived and actual effects of a user's actions are important factors in user-centred design and the efficient use of affordances (Pea, 1993; Norman, 1998). It is clear that the most obvious features are those being used, as predicted by (McGrenere & Ho, 2000). With this in mind, it would appear that the 'nursery slope' approach has highlighted certain affordances but hidden others. Blackboard is clearly useful for storing materials and links in a single location but this could also be achieved using a simple Web site. Communication tools could also be offered in other formats, as could assessment tools. In fact one support staff interviewee felt that the only tool Blackboard offered that *couldn't* be replicated was student tracking (course statistics tool).

The adoption of Blackboard as a nursery slope has had a desirable effect in getting numerous academics involved in a VLE but has also highlighted various deficiencies in the Blackboard system itself. These include some administrative tasks (student enrolment, batch enrolling students into groups, moving content around a course, and setting up assessments) that were time consuming, tedious or even impossible. There is also little integration with data stored in other systems (student records, personnel databases), which would enable the automation of tasks such as student enrolment. Blackboard may not be the perfect system for the institution if it cannot easily be integrated with other technology, has poor interface design and does not reflect existing academic structures.

Concerns over the interface, maintenance and development of Blackboard seem to have led to a view prevalent within the support services that it should in fact eventually be replaced with something developed locally, affording fuller control over functionality and integration with other systems. Key issues here were difficulties experienced in student enrolment and data integration. Opinion was divided about the best way forward however. On the one hand, dropping Blackboard in favour of an 'in-house' solution could offer systems integration and a more precise match with

educational needs, but would be costly in manpower for development and maintenance. It was thought relatively trivial to reproduce the main features of Blackboard, and less trivial but attainable to integrate these with the University's new Web-based 'Portal'[50]. On the other hand, keeping Blackboard meant a VLE that is already fully functional, but difficult to integrate and control. It also provided quite limited mapping onto university structures (especially the hierarchy of programmes, course units and elements – difficult when Blackboard is built around individual courses).

As one participant observed, Blackboard offers a kind of "walled garden" (for each course) in which to place and develop educational materials and tasks. Whilst this was seen as positive, the insular nature of each course suggests a 'collection of walled gardens' – each with high walls because of the difficulty of setting up places for programme-wide information or linking between courses to represent a hierarchy in programmes of study. There were also concerns about the interface suggesting standardisation, hegemony, institution-centrism, even Americanisation[51].

Whichever route is taken, enabling the hoped for extension of teaching and learning would be a non-trivial task involving greater levels of technical integration, systems design and staff development. Improved technical integration would be necessary to provide automation of enrolment into groups that could facilitate the uptake of group area facilities for collaborative work. It should also enable course structures to be more accurately presented with some information and functions being maintained once for a programme rather than multiple times for several course units.

The more complex the courses or departments involved, the more data integration will be essential. This can be seen from the uptake of VLEs in medical education, where long professional programmes of study with complex structures and large numbers of students in multiple groupings rotating around different parts of the course is the norm. Each medical course also has its own distinct curricular approach. Cook (2001) conducted a survey of the use of VLEs in six UK medical schools. He concluded that non-commercial, bespoke VLEs are more suitable (and more widely used) for medical education "due to profound differences in medical curricula at different medical schools" (Cook, 2001:9).

6.7 The two tribes

One of the most interesting themes was that of the "Two Tribes" working from different perspectives to achieve a Web-based teaching and learning portal. These perspectives are intimately entwined with the issues involved in the "best way forward" noted above.

One "tribe" (mainly but not exclusively academics) is characterised by an interest in ***expediency***. They want tools that will do what they want now and are not always willing to wait for solutions which might have a better technical or institutional 'fit'. They are quite happy to use off-the-shelf commercial products if they get the job done.

The other "tribe" (mainly but not exclusively computer services and support staff) are focused on ***sustainability***. They are the ones taking the longer term view of online technologies – ensuring systems are compatible with each other and can be maintained and developed in-house wherever possible. They have a preference for local development using 'open source' software tools so that fully integrated systems with all the required functions can be provided.

The above description implies two completely polarised groups whereas it would be more accurate to think of two opposing **viewpoints** with which people are struggling, with some people leaning more to one than the other.

It appears from the interviews that this has been a challenging but ultimately fruitful tension. Through meetings relating to the implementation of Blackboard and the development of the University Portal site, these two opposing views have been brought together. The Learning Technology Support Service[52], the development of a draft University "e-Learning strategy" (O'Leary et al., 2003) and the Portal Development project (Appendix 10) have also brought the issues into focus.

Through such discussions and developments a good working relationship appears to have been forged between the two tribes. This is not to say resolution has been reached. It is evident that dissatisfaction with Blackboard and the need to integrate software systems will presently force some specific decisions about what kind of learning environment is to be supported in future.

The existence of two tribes echoes the study in which Jones *et al.* (2000) found two groups of employees with conflicting paradigms (long-term vs. short-term) for the

use of a new technology being introduced. Werner Rammert's rules for interpreting studies of technology (adapted from Giddens, quoted at Appendix 15) also stress the social context of technology and the important role of social actors in determining the course of its development and implementation (Rammert, 1997). These rules appear to apply well to the findings of the current study. Rule 8 (negotiation between social actors) and rule 9 (changes in technology projects involve "translations between different rule systems", coordination and negotiation between different social worlds) are most pertinent to the 'two tribes' issue.

6.8 Relevance of the literature review to this discussion and analysis of data

As described in the literature review, the Web has evolved to provide a level of sophistication that makes VLEs and MLEs possible and capable of extension through developments like service-oriented architectures. The technical distinction between a VLE and a more broadly integrated MLE has been very pertinent to the findings regarding Blackboard's lack of integration with university systems and its relationship to the Portal project. It is also necessary to understand this distinction to comprehend the nature of the 'two tribes' debate.

The expectations of learners, though difficult to assess in a study focused mainly on staff, that online learning is now a natural activity is evidenced in their increasing use of the system and comments from academics that using Blackboard is relatively unproblematic for students (other than authentication problems) (section 5.5.4). The pivotal role of teachers (Lim & Barnes, 2002) is also apparent where academics are seeking (not always successfully) to optimise the online learning environment for their students.

The expectations of staff alluded to in section 2.9 appear very pertinent to the data on staff workload, strategic direction and the adoption of new technologies. In particular the literature on affordances (section 2.10) provides a clear understanding of how academics are likely to have chosen specific VLE tools because of a mixture of perceived and actual affordances. They would have had expectations of what Blackboard *can* do, initial perceptions of what a VLE *should* do and then would have encountered the features most clearly *presented* to them within the Blackboard design.

The rhetoric of ICTs in education, online learning and the 'virtual university' has been largely positive in assuming and assuring learning gains (section 2.2). It was noted however that caution is counselled by several commentators. This seems to be borne out by the finding that most Blackboard use is content driven – similarities in patterns of use to the Durham studies (University of Durham, 2004) have been striking – and evidence of dialogues such as Laurillard's 'conversational framework' (Laurillard, 1993) has not emerged. This seems to have been largely due to a lack of training and support of academics, and fears that online collaborative tools create a "time-trap", as found elsewhere in the literature (section 2.7). As noted above (6.4) the learning paradigm across the institution appears to favour a content-centred approach to VLEs.

As discussed further below, socio-cultural approaches capable of organisation-level interpretations are likely to provide most insight into perceptions of VLE use and implementation. Specifically, the idea of communities / networks of practice (section 2.11), structuration and actor network theory (section 2.12) provide a useful framework for considering the implications of the current project.

Therefore the literature reviewed in chapter 2 has supported a thorough interpretation of the data arising from the current study.

6.9 Strategy and leadership

Various parts of the qualitative data point to (at least a perception of) a longstanding lack of leadership and strategic direction on VLEs and e-Learning. This applies at departmental and institutional level. Even where departments had a policy of adopting Blackboard they were somehow not quite able to get all staff using and engaging with it. Whilst the University has expended energies and resources in developing an e-Learning strategy and a Portal project, this has not yet translated into wide-scale innovations in online learning. Investment in Blackboard has certainly enabled a large number of academics and students to benefit from the use of this VLE, as shown in the usage data. There is evidence however, that the ongoing uncertainties about the future of Blackboard within the institution – brought into focus by the "two tribes" issue – might have limited the adoption and innovative use of the system. Staff are unlikely to invest a great deal of time in a system they

are not sure will be there in 2 years, especially where they already have pressures from research, teaching and other quarters.

Other surveys are also highlighting the need for adopting institutional policies on VLE use (Connor & Bird, 2003).

> "Blackboard non-usage by staff is not associated generally with the Blackboard system but reflects more the lack of institutional policy on VLE usage and greater staff support. In addition, many members of staff expressed a need for increased sharing of practice across the institution and staff development in pedagogical, in addition to technical aspects of online learning." (Connor & Bird, 2003:2).

A "teaching portal" – initially provided by Blackboard – was always a part of the Portal project plan, and some staff had attempted to describe what would be required to meet the institution's needs. The specification for this (McFarlane & Squirrell, 2002) is a far cry from what is or even can be provided by Blackboard. In particular the student profile and progress components would be impossible or very labour intensive to produce within Blackboard, but might now be less challenging via the Portal, as confirmed in some of the interviewees.

The evidence is that a perceived lack of strategic direction has hindered VLE implementation. The fact that Blackboard was originally chosen by a subsection of support services, rather than at the top level of the institution, essentially on the grounds of "ease of use", and the ongoing uncertainty regarding length of Blackboard service, underline this finding. It is difficult to know whether faster progress could have been made given the diverse and 'loosely-coupled' nature of higher education organisations (Weick, 1976). Lisewski (2004) notes the difficulties of implementing top down strategies in universities that are made up of many interrelated sub-cultures, and notes the need for strategists to know "the 'cultural configuration' of their organization and the likely response of the practitioners to... strategic learning technology innovations." (p186). This leads us to consider the social context of VLE development in the next section.

6.10 Socio-cultural interpretations of the development of online learning environments

Academics' use of the VLE was situated in the complex workplace of a university and also may have required legitimate participation in a community of practice involving those with a professional interest in this learning technology. Wenger

(2000) describes three modes of belonging to a community of practice: engagement, imagination and alignment. The use of Blackboard by academics could be said to demonstrate ***engagement*** in mutually agreed tasks and the production of artefacts (learning resources). The evidence suggests, however, that this has largely been a pragmatic solution to providing learner support in the face of a pressing research agenda, rather than aspiring to some communal vision of online learning. Similarly, there is little evidence of academics being involved (collectively) in the ***imagination*** of how they as a community of teacher/practitioners might reflect upon or (re-)orient their practice to explore further possibilities for the technology. This kind of imagination was more evident in the support staff, as might be expected. ***Alignment*** with local activities and other processes was arguably quite good for academics in that they achieved practical uses of the VLE with minimal impact on other activities. For support staff there was perhaps a more obvious lack of alignment between their espoused goals for the development of online learning and its observed use.

Further analysis using the framework of communities of practice might be fruitful but problematic as there are at least three types of community at work (learning technologists, academic subject/research communities and computer services), with currently limited alignment between the goals of each. On the other hand, Wenger (2000) does note that boundaries between communities can be productive sites for innovation. They are places where different views, different ways of engaging, different knowledge and skills repertoires, ways of communicating, and capabilities meet offering a chance to explore new ways of doing things. This could certainly be said of the discussions between the 'two tribes' (see 6.7), which might involve 'communities of practice' for academics and computer services staff (perhaps with support staff acting as honest broker in between).

The people involved in using this VLE appear not consciously to be working in relation to any communities of practice organised around aspirations for virtual learning, although some clearly do have aspirations for enhancing the educational experience of their students. Jones' (2004) network metaphor – particularly with the view of "networks as self-organising structures that lie somewhere between order and chaos" (p84) – or Brown & Duguid's (2002a) networks of practice might be more fruitful avenues for future research. Distributed cognition or activity theory may also be useful in further analysis of specific aspects of Blackboard use, but for the wider

picture more pertinent to this study we now turn to a sociological interpretation of technology adoption.

6.11 Sociological interpretations of the development of online learning environments

Technological innovation always occurs in a social context and so can be informed by sociological models. These recognise the centrality of human and organisational factors in the implementation of technologies. It is interesting to reflect on some of the dimensions (Figure 36) of Gidden's structuration theory (Giddens, 1984; Jones et al., 2000). In terms of ***meaning***, staff appear to have been moving towards a mutually recognisable signification (understanding) of a VLE by using Blackboard and through communication with support staff. Conversely, interpretations of what this VLE should exactly look like and do may still be quite diverse.

In terms of ***power***, whilst computing services and management hold sway over the strategic choice of VLE (and Portal) tools, academics and the support services seem to have significantly influenced the choice for Blackboard on grounds of 'ease of use'. In addition, the domination of the 'research culture' could be said to limit or override the legitimation of involvement of academics in online (or other kinds of) teaching. Resistance to culture change was discussed in the interviews, and was noted amongst the top five disadvantages of implementing managed learning environments in the HE sector (JISC & UCISA, 2003).

	Meaning		**Power**		**Norms**
Structure	Signification	⇆	Domination	⇆	Legitimation
	↓↑		↓↑		↓↑
(modality)	Interpretative scheme	⇆	Facility	⇆	Norm
	↓↑		↓↑		↓↑
Interaction	Communication	⇆	Power	⇆	Sanction

Figure 36: Dimensions of the duality of structure (adapted from Jones et al., 2000).

In terms of ***norms***, strategic groups have been formed and modified to legitimate the process of arriving at decisions relating to the further development of a 'teaching

portal' (through whatever technology). There is evidence of some heated discussion regarding the two alternative ways to provide a VLE (commercial vs. home-grown). Although working in the same institution, the individuals will generally have been working in separate buildings and communicating electronically as is normal these days. It has been noted that groups relying on technology due to physical separation can be prone to conflict (Hinds & Bailey, 2003), though 'conflict' might be too strong a word here. The validity of each perspective was reinforced by several participants. The VLE system Bristol ends up with must at the least do everything Blackboard does (only better) and interoperate with the portal. Through a legitimated set of committees and discussions calling on the opposing viewpoints, the two tribes are working towards such a solution.

Munir & Jones' (2004) model appears much more informative for predictive purposes. In terms of ***problematization***, the consumers (academics and support staff) have a number of shared understandings of Blackboard and its capabilities. This may, however, be limited to the most obvious and instantly usable features (content upload and communication tools), with other tools being much less understood. In terms of ***enrolment***, the raised profile of the VLE established during the past three years was linked to a number of important groups and players (including the official support of the Information Services department) and helped lead to a substantial increase in usage. Without improved and prominent strategy direction, however, numbers may not increase further or may even decrease (and are already relatively static two years running). In terms of ***obligatory passage points***, Blackboard is the only institution-wide VLE so enjoys exclusivity in that sense, but the tools it contains (email, online assessment, Web page generation, content upload or discussion boards) are freely available elsewhere in the institution. In fact, the data tends to suggest that most functions within Blackboard could be done as well or better using in-house, open source technology and so have the additional benefit of probably being made more fit for purpose. Therefore, the future of Blackboard is in the balance.

6.12 Scope and limitations of the study

The research questions all relate essentially to staff perceptions since, whilst the student view is very important, it is staff who need to be centrally involved in the creation and implementation of a VLE. The reasons why this does and does not happen are important and often overlooked.

The sample is liable to represent the departments in which particular people have taken the initiative to set up Blackboard courses. The objectives of the study, however, were focussed on existing usage of the VLE, so the most useful and interesting data was expected to come from people already engaged in creating VLEs.

All Blackboard usage data for a 3 year period was collected and analysed. The level of detail possible, particularly with the data taken directly from the Blackboard database, allowed precise reporting of exact kinds of activity on the system. Each individual access could be linked to a specific kind of action at a specific time point, enabling educationally significant global categories for this activity to be formed from this very large dataset[53]. The time and computer power required to analyse such a large dataset was significant, but a good investment in terms of the level and accuracy of data produced. It represented an important source of information on changes in activity over time and a 'backdrop' to the qualitative data, useful for illuminating and triangulating the comments made.

A potential limitation of this approach was the necessity to rely on Blackboard's own activity descriptors in order to make sense of the data. There would seem to be little way round this other than triangulation with an extensive survey requesting detailed reporting by users of their actions, which was outside the scope of this study. Instead, cross-referencing with interview data was used.

The qualitative data enabled staff to provide their perceptions of the VLE and its use. This data could be used to interpret the quantitative data. Probably a significant omission was the lack of any interviews with students. Given the focus of the research questions and the time available, however, it was considered best to focus on staff interviews only. Staff were of course able to comment to some extend on students' use of the system and usage data included all student activity.

The interviews were mainly with initial enthusiasts, whereas ideally one would recruit further users to investigate later use more fully. Within the resources available, however, a longitudinal dimension was incorporated by holding second interviews with some staff. Also, staff were selected to be representative of a range of subject areas and course types, and included both academics and support staff.

Chapter 7: Conclusions

This study has combined accurate usage statistics with a qualitative analysis of staff perceptions of a VLE in a university. In doing so valuable insights have been gained into the use made of the system and into what has driven and limited this use. These should be of interest to all institutions as most have installed or are in the process of implementing their own VLEs. The drivers are related to academics' needs and interests within a pressured working environment. Constraining factors are related to the socio-cultural context within which the VLE has been implemented. The conclusions of the study will be discussed in relation to the five research questions (1.4, p15).

7.1 How is the VLE being used by staff? (Research Question 4)

The implementation of the Blackboard VLE has led to substantial use of a subset of features, namely, content upload and communication tools. Whilst discussion boards and group email have been used to a relatively high degree (20-30% of the number of hits for content), assessment and other tools were hardly used at all in comparison. In fact the relative use of communication tools had fallen from a much higher level in 2001-2 (80% of the number of hits for content). Combined with interview data identifying academics' frustrations in achieving effective collaborative learning, this usage profile suggests a *content-driven* approach to education. Yet VLEs are promoted as enabling active collaboration and knowledge construction using media which are time and space independent. The use made by students of the downloaded materials has not been a focus of this study so it is of course possible that they are using them in collaborative ways. If they are, however, this is not apparent to their teachers and not something facilitated prominently through the VLE.

These results confirm those of other studies and assertions by several authors that VLEs tend to be used more as a passive online store of course materials than as innovative tools for supporting interactive learning. One has to ask, however, why is this the case? It is evident from the qualitative data that this 'virtual filing cabinet'

was in fact highly valued by academic staff – as a repository for both students and fellow staff – as it provided facilities to upload and share materials online without the need for great technical expertise. Academics also noted the benefits of being able to bulk email groups of students – something which had not been easily achievable using any other systems.

The large upsurge in use from 2001/2 – 2002/3, and the high proportion of courses active over 2-3 years also confirms that a large number of academics found Blackboard useful. The absence of further increase in activity in 2003/4, however, suggests a saturation point was reached but further monitoring would be necessary to establish the longevity of this pattern.

The use of assessment tools showed the lowest numbers of hits but also the largest increase (73.4 fold) in accesses relative to its starting point. This perhaps vindicates the "nursery slope" rationale for adopting Blackboard in that additional tools are beginning to be used by staff and students. The increase in non-administrative accesses for assessment and content also indicates increasing use of these features by students following establishment by academics. Continued monitoring could determine whether these trends continue and spread to further features of Blackboard which are as yet underutilised.

Academics confirmed that they had a specific purpose in mind when starting to use Blackboard. There has therefore been 'limited pragmatic utilisation' of the VLE but there are indications of both willingness to experiment with additional tools and of growth in use of some of these.

7.2 In what ways do staff expect that VLEs will support learning, teaching and assessment? (Research Question 1)

Academics aspired to use Blackboard to enhance teaching through collaborative learning. They appear to have been unable to achieve this through lack of time and knowledge, and experienced frustration because of this. Support staff understood how to achieve more successful online collaboration (and in some ways a

'knowledge gap' was evident between them and academics), but also saw that academics have little time to do any more than 'the basics' of content upload.

Time to invest in VLE development is constrained not only in the physical sense but also in a cultural and strategic sense. The research agenda pervasive in universities means that in order to survive departments and individuals must concentrate first on publication outputs to maximise research income. Most teaching activities, including VLE use, become sidelined to some extent. This seems to apply even more to VLE innovations because of the additional time investment required for learning the system and creating a site. Reports of the isolation felt by academics (especially early in the study) experimenting with Blackboard serve to reinforce the notion of teaching as a 'second string' activity.

The academics interviewed had some clear ideas of how they would ideally like VLEs to be used. Where they saw it as a simple but valuable repository of shared materials, Blackboard met this need well and academics seem to have been pleased with the results. Where it was seen as a tool facilitating active collaborative learning, there was frustration and even some disillusionment when academics encountered difficulties in engaging students in this mode of learning.

Expectations seem to have differed for academics and support staff. The latter, seeing the potential of VLE systems for collaborative learning, felt frustrated that this was not easy to replicate locally, that "the message isn't really getting out..." (221-SS-P2). Their comments point towards a sense of missed opportunity, of having to *lower* their expectations. They echo views from the literature concerning the passivity inherent in many VLE deployments.

Another perspective emerging from the qualitative data involves views of how Blackboard relates to developments in the university's new Portal site. Those involved in this development tend to take a tool-based approach to "teaching portals". There are many Web based tools capable of reproducing the functionality of Blackboard – it is simply a matter of putting the most popular ones together with an interface appropriate to local requirements. This pragmatic approach sidesteps the issue of what an effective online learning environment should do and simply concentrates on providing the tools requested by others with (or without) such a vision.

In broad summary, there are academics who require a simple to use system to share learning materials, provide communication and perhaps assessment tools; support staff who accept this need for pragmatism yet hanker after more interactive and dynamic VLE use; and portal developments which seem to be driving forward a pragmatic view of VLEs (and portals) as collections of tools to be combined and tailored to suit.

7.3 How do these expectations relate to explicit/implicit views of the learning and teaching process? (Research Question 2)

As noted above, perhaps the most striking feature of the observed and expected use of Blackboard is the predominance of a content-oriented view of teaching and learning. The balance appears tipped towards acquisition of knowledge and away from participation in collaborative learning. Notwithstanding the aspirations of support staff and academics towards collaboration, the majority of intended and observed activity has been focussed on the upload and sharing of course materials. This can be diagnosed as a relatively passive modality. Certainly the 'virtual filing cabinet' approach is criticised by support staff and in the literature as ineffective. However, the fact that this and other studies show it to be the most popular use of a VLE indicates there must be some perceived merit in it.

An addition, academics are keen to support and involve students in the learning process through a variety of means, not only Blackboard, to provide dialogue, involvement, support and control for students. They can provide scaffolding for a topic by uploading appropriate documents and web links. Furthermore, they note the control that "media savvy" students have in choosing material to support their own learning. But the evidence of frustration at the ineffectiveness of attempts at supporting collaborative learning on Blackboard, and at the limitations of the system and its interface, show that academics and others realise there is more one could do with a VLE. They are not always empowered to do so for various reasons, to be discussed below.

7.4 In what ways are the above expectations congruent/incongruent with the capabilities of the VLE being implemented? (Research Question 3)

The emergence of socio-cultural explanations in the study means this question requires broad interpretation. Starting with the capabilities of the VLE itself, the discussion will then be widened to include aspects of the social context relevant to its implementation.

Blackboard has provided an easy way to create and online presence for a course, with materials, communication tools and the possibilities of other useful features. It has been described as a 'walled garden' where everything for a particular course is displayed within one familiar site. This level of us is highly congruent with Blackboard's capabilities. Difficulties are encountered, however, where programmes of study contain many course units (as is usually the case). Here it is difficult to provide generic programme information across several Blackboard courses without designating one course for programme level information or copying material across several courses. The added complication of this and the lack of 'windows explorer' type tools for moving files within Blackboard noted by respondents made such solutions unattractive.

Certain tasks are more difficult or labour intensive and this also limited use of the system. The lack of automated student enrolment provided an additional unwanted task to academics using Blackboard and a barrier to adoption by others. The absence of any automated creation of student sub-groups almost certainly contributed to the minimal use of the Group feature.

The concept of affordance is useful in interpreting Blackboard activity. In particular, people tend to use a system "in ways suggested by the most salient perceived affordances, not in ways that are difficult to discover" (Norman & Dunaeff, 1994:106). Also, the degree of affordance is related to degree of perceptual information (Figure 10 p41, McGrenere & Ho, 2000). Therefore those features most in tune with the initial desires of academics setting up Blackboard courses and easiest to understand and use will be most popular. This is reinforced by comments about other features (such as the digital drop box) being difficult to use or interpret.

The development of a portal site in parallel to Blackboard has enabled some support staff to see that there is nothing within Blackboard that could not be replicated using other tools or using systems developed for the Portal. Blackboard provides a ready made interface applicable to all courses but standard interfaces are also easily replicated (and, more importantly, tailored) on an in-house portal site.

At the same time there has been an ongoing discussion between two opposing views of how best to establish an online learning system – through the commercial route (Blackboard), offering immediate use, or a bespoke system allowing for better matching with user requirements and integration with existing systems, but introducing delays in implementation. This has undoubtedly fed concerns about the lack of strategy by apparently delaying the decision on whether Blackboard is a long term solution or not.

A more fundamental and important question relevant to the choice of direction for VLEs is highlighted by this study, however. If staff currently only use a subset of tools, should these be the only tools offered? There is a danger that, if opting for an in-house solution, only content upload and discussion tools will be provided, perhaps cutting off the possibilities for experimentation with other features available through a commercial system (a continuation of the 'nursery slope' concept).

The learning paradigm for the institution appears to favour a heavily content-driven approach to online learning support, not positively emphasising the collaborative and interactive approaches favoured in the VLE literature. The present study shows that staff have aspirations beyond content upload for the VLE. The increase in assessment use also supports the view that academics are experimenting with additional uses. They are restricted in developing these by other work pressures, lack of expertise and a perceived lack of strategic direction. If these issues were dealt with, probably staff would be willing and able to devote time to developing a teaching portal closer to or even beyond the vision of online learning expressed in the literature and in local specifications focused on educational need (McFarlane & Squirrell, 2002).

7.5 Summary of key findings

The study has made the following key findings:

- Despite an evolving VLE literature which is enthusiastic about the potential benefits of collaborative and interactive learning though VLEs, the most prominent use of Blackboard has been content upload.

- The study provides evidence that people "tend to use objects in ways suggested by the most salient perceived affordances, not in ways that are difficult to discover" (Norman & Dunaeff, 1994:106)"

- Currently popular tools are not necessarily the only ones requiring support and investment if a VLE is to prove fully effective.

- The overall learning paradigm (approach to supporting learning) for the institution has been largely content-driven due to perceived deficits in strategic direction and the lack of staff time and reward for new teaching developments.

- Two 'tribes' with differing views on VLE implementation have emerged – one focussing on the expedient delivery of VLE tools; the other on long-term integration and maintenance of a potential MLE.

- Discussion between these two tribes is important in resolving conflicts between expediency and maintenance; between investment in commercial systems and targeted in-house development; and between approaches emphasising content or collaboration. Such discussions are relevant to all types of institution.

- Institutional managers require a thorough understanding of the needs and views of various stakeholders as well as available VLE/MLE functionality.

- The meaning, power and norms, within groups of stakeholders implementing a VLE/MLE need to be aligned so that there is a common understanding of the nature, function and aims of the system and how to achieve these aims.

- The level of decision making regarding choice and development of a VLE/MLE should not be too low within the institution. Decisions need to be taken with

regard to a view on the espoused learning paradigm and the provision of leadership and direction to staff using the VLE/MLE.

Although the "nursery slope" strategy of installing a VLE is to some extent vindicated by the fact that staff began to experiment with it and some useful discussions have ensued, the study shows that one cannot take "learning out of the box". Socio-cultural and technical issues and questions regarding the espoused learning paradigm(s) within an organisation make successful implementation non-trivial. Dealing with the issues arising from this study, however, should enable institutions to implement a VLE/MLE well suited to their educative and other roles.

7.6 What recommendations can be made for further development of VLEs? (Research Question 5)

These will be dealt with under the three headings of technical developments, human resources issues and strategic planning. The importance of all these aspects is emphasised not only in the current study but also by recently reported case studies of MLE implementation in higher end further education (Weedon et al., 2004).

7.6.1 Technical development

The existence of the 'two tribes' could help specify a future, more integrated VLE/MLE solution (Figure 37). This may or may not involve the replacement of Blackboard but must address the technical concerns (around enrolment, creation of groups and representation of unit and programme structures) raised in the study. Developments from the portal project and other open source systems are likely to be most beneficial in tackling such issues since the solutions can be tailored to fit local requirements by an in-house team. Whilst commercial software gives direct access to a set of VLE tools, the evidence is that the 'fit' of such software will be imperfect (difficulties in representing course programme structures and in achieving automated enrolment into courses and groups are the most important concerns from the current study).

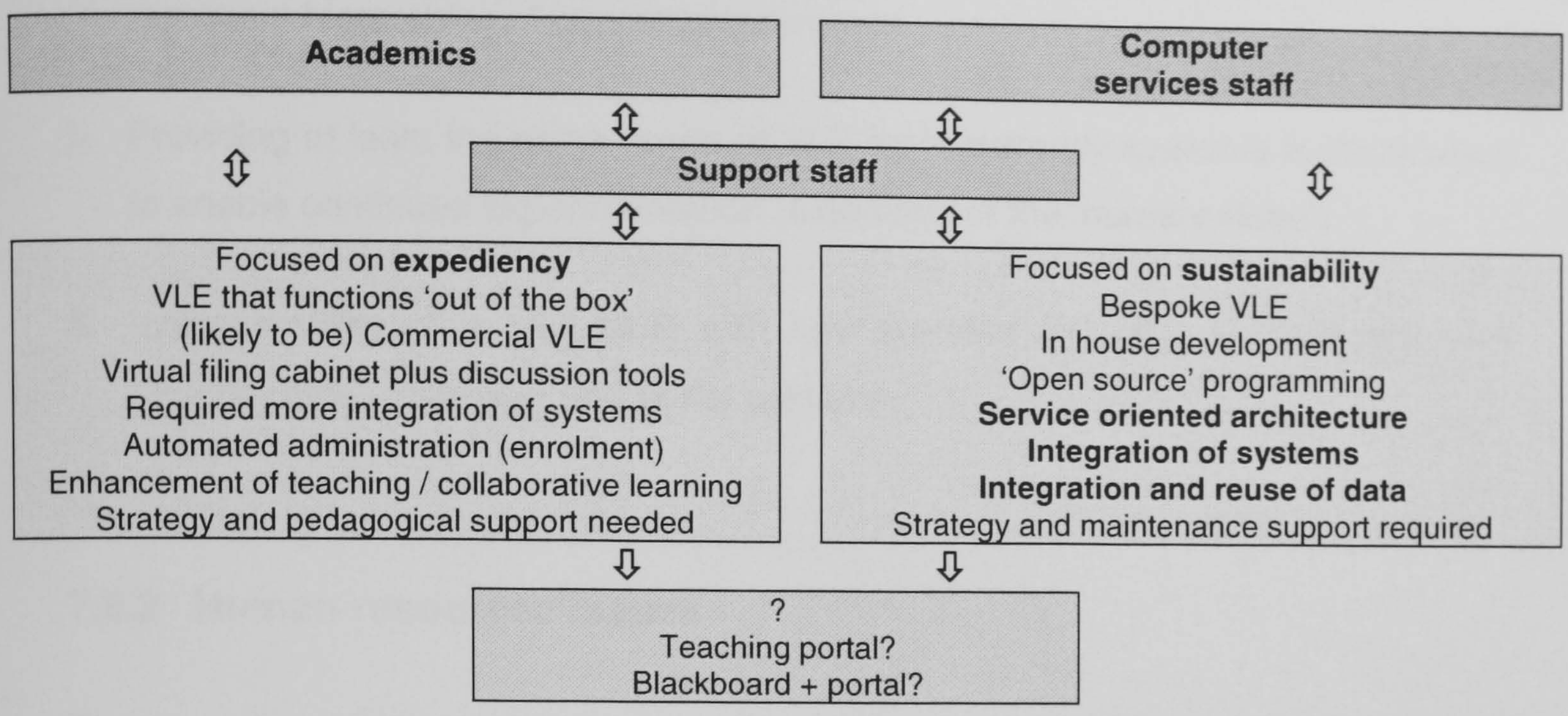


Figure 37: Components and potential synthesis of the views from the 'two tribes' identified in the study

The integration of systems and data necessary to solving these issues needs to be based on locally instigated, open source tools within a service oriented architecture (see 2.1). This will allow computing and support staff to achieve the desired sustainability. The academic may still use a commercial system or a new locally developed VLE interface but needs to be presented with a set of easy to use and understandable tools without the frustrations that have probably been barriers to adoption with Blackboard. In particular, technical developments will need to focus on the following issues:

1. Providing content upload tools that are at least as easy to use as Blackboard and incorporate a reliable and easy 'Windows Explorer' style tool for moving and copying documents and resources within the system.

2. Automating features that currently cost academic time, especially enrolment of students into courses and groups.

3. Providing communication tools that use automated enrolment to enable bulk emailing of specified groups and the creation of discussion boards group areas relevant to these groups, tailored by the academic.

4. Enabling the provision of programme level information without the need for duplication across all the course units within a programme and more accurately represent hierarchies of course programmes.

5. Providing at least the same range of VLE tools currently available in Blackboard to enable continued experimentation (extension of the 'nursery slope').

6. Interoperability of a VLE/MLE with key systems including student and staff records, email, calendar and portal systems.

7.6.2 Human resources issues

The study has highlighted the importance of human and social factors in determining the use made of a VLE. In utilising a structuration analysis, the following issues become apparent:

1. ***Meaning:*** a mutually recognisable signification (understanding) of what a VLE should do and look like will be important in creating effective online learning tools.

2. ***Power:*** change management and the authority to choose between tools and systems needs to be informed by the needs of different stakeholders as represented here in the activity on Blackboard, the "two tribes" and the domination of the 'research culture'.

3. ***Norms:*** these are emerging as the "two tribes" work towards resolution and academics start to engage in communities of practice relating to online learning.

In terms of the use of a VLE, this relates to approaches to teaching and not just approaches to learning technologies. Expertise in 'online pedagogy' needs to be nurtured to counter the frustration of academics when they are unable to facilitate collaborative learning as desired. This is not due simply to a lack of staff development opportunities as these have been available during the study. Instead, staff lack the time and also the legitimation that a clear strategy on VLE use should provide (see below).

7.6.3 Strategic planning

The institution had invested in the provision of a VLE but had not yet enunciated a coherent vision of what it should look like. A lack of strategy means that most academics are unlikely to use a VLE or perhaps other online tools in more innovative ways. This is unfortunate at a time when universities need to maximise the potential of ICT for supporting all their activities and meet the needs of an increasingly diverse student population making greater use of various digital technologies. Future strategy needs to address the following issues arising from this study:

1. Strategic decisions regarding choice and development of VLE/MLEs need to be made at the top level of the institution but involve appropriate consultation and analysis of needs.

2. Prioritisation of teaching activities, including time spent on online teaching and VLE development, within the context of a research intensive institution. This will involve recognition of the time it takes to create effective learning environments and resources – in job descriptions, departmental plans and promotion procedures.

3. Decisions regarding the most appropriate e-learning tools requiring support or development, including a strategic decision on the value placed on collaborative and interactive learning as opposed to the content-driven approach observed to date. Content upload may be the most popular tool initially but over time communication, assessment or other tools may become more prominent and need more support. A strategic view should be taken on the desirable balance of **acquisition** and **participation** that can be facilitated in the VLE/MLE, to suit the character of the institution and the needs of different subject disciplines and stakeholders.

4. The levels and nature of staff development and support should be determined from the decisions about e-learning tools and the acquisition/participation balance, with adequate resource to accomplish these.

7.7 Originality of this study

One of the key benefits of the methodology used has been a bringing together of usage analysis with interpretive research on staff perceptions of a VLE. More specifically, the socio-cultural analysis has allowed the study to generate important organisation-level findings relevant to all types of institution. The 3-year timeframe has enabled the observation of evolving patterns of use and maturing discussions between stakeholders.

The analysis of a VLE in a context wider than just use of the VLE itself – considering also the institutional context in terms of other related projects, identifying viewpoints from different staff groups and looking at strategic as well as technical issues – is something that can be generalised to similar studies at other institutions. In particular, a link is made between strategic vision for a VLE and the day-to-day experiences of using a VLE: barriers to effectiveness can be accepted or minimised depending on strategic decisions about the learning paradigm sought by institutional leaders, and the extent to which this strategy and leadership is perceived by staff.

7.8 Future research

Continued analysis of user statistics will be important in observing whether the balance of activities remains the same or whether trends such as the increase in the use of assessment tools continue. Global detailed statistics of the kind presented here are problematic to extract (because of the need to understand the meanings of Blackboard activity tags and of slow analysis due to large file sizes). As one participant commented, "Allegedly [Blackboard] tracks students, but nobody has shown me a reporting tool that actually allows you to unpack that information..." (405-ST-P2). Observing activity levels for different VLE tools is essential to the debate about how they should be used to promote learning.

Further work on how perceptions of the affordances of VLE tools and how these relate to perceptions of the teaching and learning process for academics, support staff and students would be very informative. If online learning is to be of maximum benefit then this relationship needs to be understood so that tools can be created that are effective (perform a useful educative function) and are easy to locate.

interpret and use (have a high degree of degree of perceptual information and affordance). This should also greatly inform approaches to staff development and support.

The behaviour of networks and communities of practice in the development of VLE/MLEs will also be an interesting area. The ways people interact in order to achieve teaching goals through technology and the drivers and constraints present in the work environment appear to be important determinants in the successful adoption of VLEs. Tools that could be useful in this analysis include structuration theory and actor network theory to interpret the social processes involved in MLE implementation. These can provide insights into the 'macro-social' levels of technology adoption, whereas other approaches (situated cognition, distributed intelligence and activity theory) can provide understandings of technology use within smaller groups of people.

Finally, research needs to inform the planning of virtual environments by describing the ways in which learning – both formal and informal – can be achieved successfully within the current context and culture of higher education. This should allow for rational choices to be made about the particular kinds of VLE/MLE an institution finds appropriate and, combined with the other research approaches above, how best to nurture and support their creation and adoption.

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List of Abbreviations

Term or Abbreviation	Explanation
Bbd / Blackboard	Blackboard installation at the University of Bristol, http://www.bbd.bris.ac.uk/
Blackboard	Commercial vendor, Blackboard VLE product, http://www.blackboard.com/
CMC	Computer-mediated communication
Dolphin	The student records system
ICT	Information and Communications Technology
ILRT	Institute for Learning and Research Technology,
Instructor	Term used by Blackboard to denote the person (usually member of academic staff) responsible for administering a course.
IRIS	The University of Bristol's Integrated Research Information System, https://www.iris.bris.ac.uk/
IS, ISER	Information Services, http://www.bris.ac.uk/is
IT	Information Technology
JISC	Joint Information Systems Committee, http://www.jisc.ac.uk/
LTSN	The Learning and Teaching Support Network, http://www.ltsn.ac.uk/
LTSS	Learning Technology Support Service (part of ILRT and IS), http://www.ltss.bris.ac.uk/index.htm
MLE	Managed Learning Environment
OLE	Online Learning Environment
PC	Personal Computer
PIMMS	Personnel Information database
Porpoise	(Dolphin's friend) – a Web based interface to the UoB student data
UoB	University of Bristol
VIOLET	Virtual Integrated OnLine Environment for Teaching, http://www.bris.ac.uk/is/projects/violet/
VLE	Virtual Learning Environment
VMLE	Virtual Managed Learning Environment
Web, WWW	World Wide Web

Appendix

Appendix 1: Evaluations of the Blackboard software

Numerous evaluations of VLE software exist on the Web. Many focus purely on technical issues such as versions of server software supported, maximum number of users, which e-tools are included and so on. One of the few to concentrate on educational aspects can be found on the EduTech Web site[54]. The summary from this site is as follows:

Edutech's summary of its analysis of Blackboard version 5 (Edutech, 2002):

Strong points

Does not lack essential functions.

- Simple to use interface
- Strong built-in synchronous communication: the Java applet "Virtual Classroom" includes a shared whiteboard, chat and slide presentations.
- Good teamwork support.
- Differentiated access rights and user roles
- Powerful spreadsheet-like management of student's grades

Weak points

- Very limited customizability of user interface;
- Student can only make "global" annotations for a whole course.
- Very limited hypertext features.
- No search function.

Edutech's summary of its analysis of Blackboard version 5 (Edutech 2003):

Strong points

- Clean, easy-to-use interface
- Powerful "virtual classroom" tool
- Good possibilities for interoperating with other systems (e.g. students and administrative information systems)
- Building blocks programme for extending the system
- Good documentation

Weak points

- Limited customizability of look and feel
- No internal resource or file manager
- Frame based display: no bookmarking of individual course pages.

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Supervisor: Professor Ros Sutherland

Appendix 2: Focus group topic guide

Introduction Text
Hello and welcome to this Focus Group on teaching with VLEs.
My name is Stephen Greenwood and I am an Education Lecturer in the Medical Faculty.
This Focus Group is part of my doctoral studies and is funded by the Learning and Teaching Group under their annual Learning and Teaching Awards Scheme.

Some definitions first. A Virtual Learning Environment (VLE) is

> "... the 'online' interactions of various kinds which take place between learners and tutors" – used by the Joint Information Services Committee (JISC).
>
> A typical VLE might include content delivery and management, curriculum (structure, mapping), communication tools, tutor support, assessment and tracking.

You have been selected from the list of people registered as having an involvement with a course on the University of Bristol's Blackboard Web site.

- This may imply a wide range of involvement of course from intense to quite minimal.
- The main thing is that you have heard of VLEs and are interested in contributing to a discussion about them.
- We are focusing today on Blackboard as the main example of a VLE

The discussion will be recorded in several ways.

1. It will be tape-recorded and transcribed because this is part of my research for my doctorate and I need to make sure I get the full details in order to analyse them properly.
   - Please try if possible to ignore the tape machine. The tape lasts 1 hour so should not need to be changed unless we are so engrossed in discussion that we go over the hour(!).
2. Emma and Paul will be taking short notes of the first few words each person says so that the professional transcribers can make sense of the tape. Again – please try to ignore them!
3. Jules will be writing on the flipchart partly for later analysis but more to help summarise what has been said for the group.

Order of discussion:

1. Introductions.
2. Descriptions of your actual use of Bb / VLEs.
3. Features of Bb / VLEs.
4. Wider issues related to VLE use.

Finally, I hope you enjoy the discussion. It is intended to be a relaxed and open discussion in which people can express their views as frankly as they wish. There are a couple of Ground Rules however to enable this to happen:

- Only one person should speak (have the floor) at any one time
- Participants are permitted to hear each other's responses and to make additional comments beyond their own original responses as they hear what other people have to say.
- It is not necessary for the group to reach any kind of consensus, nor it is necessary for people to disagree.

Any questions?

Topic Guide:

Prompts for the discussion	Time guide	Equipment / theory prompts
Introductions… • Introduce yourself, your department/course/school/faculty • Have you used Bb/VLEs – if so **briefly** for what? • (Optionally) a "one-liner" about why you accepted the invitation to this Focus Group.	5 **[5]**	**>>> Flipchart**
Describe actual use(s) – ***RQ1. In what ways do staff expect that VLEs might support learning, teaching and assessment?*** • moderator and group members can ask questions… In what ways do you think you are using it to support learning? • What is the balance between providing information or requiring students to acquire it, as opposed to participating in discussion online? • How much voluntary participation is there? • How much participation is required from your students? In what ways do you think you are using it to support teaching? • What forms of teaching (if any) are you using on Bb? • Did you anticipate that it would change your opportunities for communication withy students? • Did you anticipate that it would change your administrative load? In what ways do you think you are using it to support assessment? • What forms of assessment (if any) are you using on Bb? • Was assessment an important factor in your decision to start using Bb?	5 5 5 5 **[25]**	Collis & Moonen (2001) Acquisition / Participation
How does your use relate to the way you would normally work with this group of students? ***RQ2. How do these expectations relate to explicit/implicit views of the learning and teaching process?*** • Do students access or use learning materials in a different way? • Are there different interactions with you as a teacher? • Do you think it affects the way students work/study? • Are students more, or less, able to provide input into the course? • Are there differences in the group cohesion / dynamics? • Managing (high?) expectations [Milligan 1203]	10 **[35]**	***VSM:*** Beer (1981) Resource Neg Coordination Monitoring Individualisation Self-Organisation Adaptation ***Interaction is:*** Laurillard (1993) Discursive Adaptable Interactive Reflective
RQ4. How are VLEs currently being used by any staff who have already developed a particular interest in using them and what examples of innovative practice can be		**Affordances**

identified?	5	
What does it offer you that your normal mode of teaching does not offer?	5	
What does it not offer or remove that your normal mode of teaching does offer?	**[45]**	
Features ***RQ3. In what ways might the above needs and expectations be congruent/incongruent with the capabilities and goals of the VLEs being implemented in particular departments?***		Collis & Moonen(2001) Effectiveness Ease of use Engagement Environmental
What have you found to be the most and least useful features? (*Effectiveness*) • In terms of the effectiveness of learning? • In terms of short-term efficiency? • In terms of longer-term pay-offs?	5 5	
What most interests you - and perhaps colleagues - about the system? (*Engagement*)	5	
Do you find it easy to use? (*Ease of use*) • are there any software problems? • are there any hardware problems?	5	
What barriers are there to your using it? (*Environment*) • may lead into the wider issues…	**[65]**	
Wider issues ***RQ5. What recommendations can be made from an educational perspective for further development of VLEs and VLE-creating facilities at the University?***		Collis & Moonen(2001) Institution Implementation Pedagogy Technology
Do you think there are any important technological improvements that could be made? (*Technology*)	5	
Do you think there are any educational features missing or that could be improved? (*Pedagogy*)	5	
What will be the most effective way to implement a VLE in your department? (*Implementation*)	5	
What do you think the University of Bristol would be gaining (or losing) by adopting a VMLE? (*Institution*)	5	
What will be the most effective way to implement a VLE more widely across the University? (*Implementation*)	**[90]**	

Author: Stephen Greenwood
Supervisor: Professor Ros Sutherland

VLE Evaluation Focus Groups / Interviews

Confidentiality statement

"By participating in this focus group / interview it is assumed that you give permission for your words, suitably anonomysed, to be used in the analysis and writing of reports and other publications related to this research. No direct quotations will be used without first showing a copy to the originator to check for accuracy and obtain consent, but summaries of themes and issues will be deemed not to require such consent. Real names will be disguised in any report or publication unless the originator of a quote provides express permission to use their real names."

Signed: Dated:

Appendix 3: User statistics generated by Blackboard

Blackboard produces a number of different statistics for each course (Figure 38). These are displayed in sections:

1. Total Number of Accesses per Area:
   i. Communication Areas (discussion boards, collaboration tools)
   ii. Main Content Areas (file upload – slides, handbooks and other files)
   iii. Group Areas (parts of courses designed for use by a subsection of students enrolled on a particular course, for instance a tutor group, with the same e-tools available as the main course)
   iv. Student Areas (e-tools targeted at students such as assignment submission, edit personal homepage, view grades, address book, calendar, manual and change password)
2. Number of Accesses over Time
3. User Accesses per Hour of the Day
4. User Accesses per Day of the Week
5. Total Accesses by User

Sections 1, 3 and 4 include an aggregate table as well as a table of accesses for each student enrolled. Section 5 shows students who made one or more accesses and could be reproduced from data in section 1. Accesses per student from section 1 were used to produce aggregate data for further analysis of course usage. Section 2 was used to provide start and end points for the usage figures.

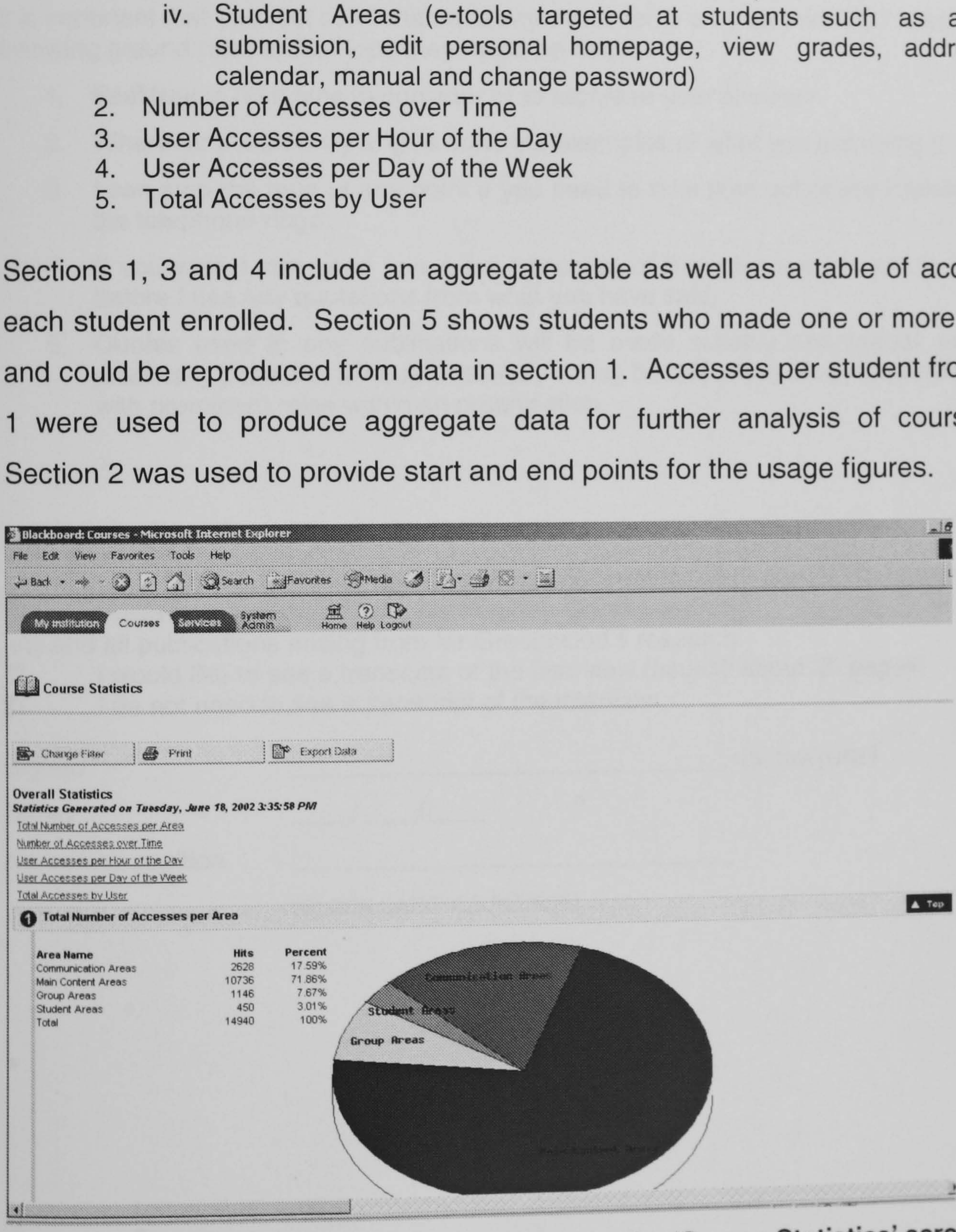

Figure 38: A Blackboard course screen showing the 'Course Statistics' screen.

Appendix 4: Interview consent form

Name _____

Interview Consent Form

This interview is part of a study into the implementation of Virtual / Managed Learning Environments (VMLEs) at the University of Bristol. It will be tape-recorded and transcribed purely so that I can be sure I collect all the necessary data and do not misrepresent your words.

It is important that you feel comfortable to say whatever is on your mind so I have written the following ground rules in the hope they might be helpful.

1. Feel free to take time to consider or to rephrase your answers.
2. Wherever possible try to give concrete examples of what you are trying to say.
3. I can stop the tape at any point if you need to take time out of the interview – e.g. if the telephone rings.
4. If you wish I can send you a full transcript of the interview for you to check over before I use any quotations from what you have said.
5. Quotes used in any publications will be made suitably anonymous as far as is practically possible, although naturally it may be difficult to always anonymise people with prominent roles within an organisation.

Declaration

I, _____ hereby give my consent for all or part of the transcript of the interview held between myself and Mr Stephen Greenwood on ____/____/____ to be used in any and all publications arising from Mr Greenwood's research.

☐ I would like to see a transcript of the interview (usually about 20 pages)

☐ I do not need to see a transcript of the interview

Signed _____ (SIGNATURE)

Dated ____/____/____

Name and position _____

(BLOCK CAPITALS PLEASE)

Author: Stephen Greenwood
Supervisor: Professor Ros Sutherland

Appendix 5: Interview guide (Academics)

Each guide consists of a series of questions each with prompts which may or may not be used.

1. How have **you** used Blackboard in your teaching or in support of learning?
    a. Why did you choose this way of using it?
    b. What other ways have you thought of using it?
    c. Why have you not done this?

2. What, in your opinion, are the **most constructive** ways Blackboard is currently being used?
    a. Can you give some examples?
    b. Why do you think this?

3. What, in your opinion, are the **least constructive** ways Blackboard is being used?
    a. Can you give some examples?
    b. Why do you think this?

4. How do you think people will use VLEs in the **future**?
    a. What is your "vision"...?!
    c. How is this different to current uses?

5. What for you are the key **support and staff development issues** in the implementation of VLEs / Blackboard?
    a. Can you give some examples?
    b. How might these differ for a home-grown VMLE?

6. How has the **Learning Technology Support Service** been involved in the process of developing a VLE at Bristol?
    a. Can you give examples of the most/least effective things it has been doing?

7. What do you think are the main considerations for teachers thinking of using Blackboard?
    a. What do they need to do or think about differently?
    b. Is there a different mindset needed to use a VMLE?

8. What do you think are the **problems** that have arisen form the implementation of Blackboard?
    a. Why do think these have arisen?
    b. Why do you think this is a problem?

9. What systems or processes relating to teaching and learning in the University have caused problems with the implementation of Blackboard?
    a. The ways courses and students are administered?
    b. Is there a different mindset needed to get the most from a VMLE?
    c. Can you give some examples?

10. Can you comment on the broader picture of VLEs at the University of Bristol – in what ways do you think that Bristol is succeeding or failing to achieve its stated goal of a "**teaching and learning portal**"?
    a. Can you say why / give reasons for why this might be happening?

11. Is there anything else you would like to contribute?

Appendix 6: Interview guide (Support Staff)

Each guide consists of a series of questions each with prompts which may or may not be used.

1. First could you tell me what your **role** is in relation to VLEs?
2. *How have **you** used Blackboard in your teaching or in support of learning?*
    a. *Why did you choose this way of using it?*
    b. *What other ways have you thought of using it?*
    c. *Why have you not done this?*
3. What, in your opinion, are the **most constructive** ways Blackboard is currently being used?
    a. Can you give some examples?
    b. Why do you think this?
4. What, in your opinion, are the **least constructive** ways Blackboard is being used?
    a. Can you give some examples?
    b. Why do you think this?
5. How do you think people will use VLEs in the **future**?
    a. What is your "vision"...?!
    c. How is this different to current uses?
6. What for you are the key **support and staff development issues** in the implementation of VLEs / Blackboard?
    a. Can you give some examples?
    b. How might these differ for a home-grown VMLE?
7. How has the **Learning Technology Support Service** been involved in the process of developing a VLE at Bristol?
    a. Can you give examples of the most/least effective things it has been doing?
8. What do you think are the main considerations for teachers thinking of using Blackboard?
    a. What do they need to do or think about differently?
    b. Is there a different mindset needed to use a VMLE?
9. What do you think are the **problems** that have arisen form the implementation of Blackboard?
    a. Why do think these have arisen?
    b. Why do you think this is a problem?
10. What systems or processes relating to teaching and learning in the University have caused problems with the implementation of Blackboard?
    a. The ways courses and students are administered?
    b. Is there a different mindset needed to get the most from a VMLE?
    c. Can you give some examples?
11. Can you comment on the broader picture of VLEs at the University of Bristol – in what ways do you think that Bristol is succeeding or failing to achieve its stated goal of a "**teaching and learning portal**"?
    a. Can you say why / give reasons for why this might be happening?
12. Is there anything else you would like to contribute?

Appendix 7: Interview guide (Strategic role)

Each guide consists of a series of questions each with prompts which may or may not be used.

1. First could you tell me what your **role** is in relation to VLEs at Bristol?

2. *How have **you** used Blackboard in your teaching or in support of learning?*
    a. *Why did you choose this way of using it?*
    b. *What other ways have you thought of using it?*
    c. *Why have you not done this?*

3. Where is Bristol today in its use of VLEs compared to other universities?
    a. On the sheet, which levels of use have you seen examples?
    b. Rough tally per level – which are the most frequent uses?

4. How did it get there?
    a. What important decisions have been made and **why**?
    b. What important decisions have **not** been made and **why**?

5. What, in your opinion, are the **most constructive** ways Blackboard is currently being used?
    a. Can you give some examples?
    b. Why do you think this?

6. What, in your opinion, are the **least constructive** ways Blackboard is being used?
    a. Can you give some examples?
    b. Why do you think this?

7. How do you think people will use VLEs in the **future**?
    a. What is your "vision"…?!
    b. How is this different to current uses?

8. What for you are the key **support and staff development issues** in the implementation of VLEs (Blackboard and home-grown VLEs?
    a. Can you give some examples?
    b. How might these differ for a home-grown VMLE?

9. What do you think are the main considerations for **teachers** thinking of using Blackboard?
    a. What do they need to do or think about differently?
    b. Is there a different mindset needed to use a VMLE?

10. What do you think are the **problems** that have arisen form the implementation of Blackboard?
    a. Why do think these have arisen?
    b. Why do you think this is a problem?

11. What **systems or processes** relating to teaching and learning in the University have caused problems with the implementation of Blackboard?
    a. The ways courses and students are administered?
    b. Is there a different mindset needed to get the most from a VMLE?
    c. Can you give some examples?

12. Can you comment on the broader picture of VLEs at the University of Bristol – in what ways do you think that Bristol is succeeding or failing to achieve its stated goal of a "**teaching and learning portal**"?
    a. Can you say why / give reasons for why this might be happening?

13. What, for you, are the most important **strategy/policy decisions** that have been made or need to be made by the **University of Bristol** in relation to developing a Virtual Managed Learning Environment?
    a. Can you give examples of successful or unsuccessful decisions?

14. Is there anything else you would like to contribute?

Appendix 8: Follow up interview guide (Academic role)

Each guide consists of a series of questions each with prompts which may or may not be used.

1. First can you comment on how your use of Blackboard has gone during the first 2 (nearly 3) years?

2. What, in your opinion, are the **most constructive** ways Blackboard is currently being used?
    a. Can you give some examples?
    b. Why do you think this?

3. What, in your opinion, are the **least constructive** ways Blackboard is being used?
    a. Can you give some examples?
    b. Why do you think this?

4. How do you think people will use VLEs in the **future**?
    a. What is your "vision"…?!
    b. How is this different to current uses?

13. What do you think are the main considerations for **teachers** thinking of using Blackboard?
    a. What do they need to do or think about differently?
    b. In what ways do staff expect that VLEs might support learning, teaching and assessment?
    c. How do these expectations relate to explicit/implicit views of the learning and teaching process?
    d. Are **innovators** still **discouraged** by poor student feedback / increased workload
    e. Has this **changed** in the last 3 years?

5. What for you are the key **support and staff development issues** in the implementation of Blackboard?
    a. Can you give some examples?
    b. How might these differ for a home-grown VMLE?

6. What do you think are the **problems** that have arisen form the implementation of Blackboard?
    a. Why do think these have arisen?
    b. Why do you think this is a problem?

7. Where do you think Bristol is today in its use of VLEs compared to other universities?
    a. How did it get there?
    b. What important decisions have been made and **why**?
    c. What important decisions have **not** been made and **why**?

8. What **systems or processes** relating to teaching and learning in the University have caused problems with the implementation of VLEs?
    a. The ways courses and students are administered?
    b. Is there a different mindset needed to get the most from a VMLE?
    c. Can you give some examples?

14. How does the implementation and use of Blackboard relate to other developments in the University of Bristol at this time?
    a. UoB Portal Project
    b. Departmental Web sites
    c. Other _____
    d. What at the problems / potential overlaps?

9. What, for you, are the most important **strategy/policy decisions** that have been made or need to be made by the **University of Bristol** in relation to developing a Virtual Managed Learning Environment?
    a. Can you give examples of successful or unsuccessful decisions?

10. Is there anything else you would like to contribute?

Appendix 9: Follow up interview guide (Support / Strategic role)

Each guide consists of a series of questions each with prompts which may or may not be used.

1. First can you comment on how the **implementation** of Blackboard has proceeded during the first 2 (nearly 3) years?
    a. E.g.: uptake, coverage across programmes/departments, changes in usage
    b. Can you give some examples?

2. Could you comment on how the **balance of different kinds of usage** – e.g.: uploading content / communication tools / assessments within Blackboard during the first 2 (nearly 3) years?
    a. E.g.: uptake, coverage across programmes/departments, changes in usage
    b. Can you give some examples?

3. What, in your opinion, are the **most constructive** ways Blackboard is currently being used?
    a. Can you give some examples?
    b. Why do you think this?

4. What, in your opinion, are the **least constructive** ways Blackboard is being used?
    a. Can you give some examples?
    b. Why do you think this?

5. What for you are the key **support and staff development issues** in the implementation of Blackboard?
    a. Can you give some examples?
    b. How might these differ for a home-grown VMLE?

6. How has the **Learning Technology Support Service** been involved in the process of developing/delivering a Virtual Learning Environment at Bristol?
    a. Can you give examples of the most/least effective things it has been doing?

7. What do you think are the main considerations for **teachers** thinking of using Blackboard?
    a. What do they need to do or think about differently?
    b. In what ways do staff expect that VLEs might support learning, teaching and assessment?
    c. How do these expectations relate to explicit/implicit views of the learning and teaching process?
    d. Are **innovators** still **discouraged** by poor student feedback / increased workload
    e. Has this **changed** in the last 3 years?

8. How does the implementation and use of Blackboard relate to other developments in the University of Bristol at this time?
    e. UoB Portal Project
    f. Departmental Web sites
    g. Other _____
    h. What at the problems / potential overlaps?

9. What do you think are the **problems** that have arisen form the implementation of Blackboard?
    a. Why do think these have arisen?
    b. Why do you think this is a problem?

10. How do you think people will use VLEs in the **future**?
    a. What is your "vision"…?!
    b. How is this different to current uses?

11. What, for you, are the most important **strategy/policy decisions** that have been made or need to be made by the **University of Bristol** in relation to developing a Virtual Managed Learning Environment?
    a. Can you give examples of successful or unsuccessful decisions?

12. Is there anything else you would like to contribute?

Appendix 10: The University of Bristol "Portal"

Summary of plans from: http://www.bris.ac.uk/is/projects/portal/

The end of Year 1 (July 2003) saw the launch to a small number of users of a Pilot Portal that is "staff-focused on student administration". Following a series of usability testing sessions, Pilot Portal V1.1 was released in September 2003. Since then the number of registered users has grown to exceed 250. Following a review of the progress made during Year 1, the Project Board has determined that the objectives of the project in Year 2 will be to achieve the following benefits:

- Provide more channels
- Utilise a delivery platform which can support thousands of users and which is resilient, scaleable and responsive
- Utilise a means of capturing and maintaining personal and departmental information so that the portal environment can be both personalised and localised

The Project Board also endorsed an approach that would see some smaller items included in addition to the main deliverables for Year 2 as a way to enrich the portal but at modest effort.

Switching to a "thin" portal

The approach adopted during Year 1 involved a "fat" portal which attempted to render existing Web applications as channels inside the portal. This exposed a number of technical, usability and political issues. Year 2 will instead adopt a "thin" portal approach by which a "front door" channel will lead the user to an existing Web application that resides outside the portal.

So how does this differ from a common-or-garden Web site that links users to useful resources?

The key differences are:

- The portal will provide a secure environment within which the user only has to login once - the user will pass seamlessly into the applications that lie behind the "front doors" without having to login again and again
- The portal will provide a personalised environment - having logged in the portal knows who you are and what you did last time - so the "front doors" can be ornamented with bookmarks to your favourite places in the applications that are available behind the front doors
- Where Information Services has control over the Web application being linked to, the application will replace the portal within the same browser window. The user can then return to the portal either using the back-button or by using a portal specific link within the application.
- Where Information Services has little or no control (for example Blackboard), the application may appear in a separate browser window.

An additional benefit of this "front door" approach is that the back-button now works in the expected way within any Web application – this proved a major usability issue with the "fat" approach of Pilot Portal V1.1.

Software Releases

The technical plan for Year 2 aims to deliver additional functionality in four major releases that will be spread throughout the year. Additional functionality will be provided in smaller ad hoc (unscheduled) releases. The major releases and target delivery dates will be:

1. Blackboard January 2004 - This will provide single sign-on via CAS to Blackboard and "jump to my Blackboard course" functionality.
2. Bookmarks February 2004 - An updated Porpoise application will provide rich student information and will offer personalised bookmarking of individual units.
3. Interface March 2004 - One of the benefits of this release is that users will be able to switch between "skins" that comply with new Web accessibility standards.
4. Groups June 2004 - The ability to manage ad hoc groups of students is the goal of this technically challenging release.

The minor releases will be:

- Contact Directory
- News-feeds
- Search
- URL Bookmarks

Appendix 11: Blackboard courses (phase 1)

Table 17: Blackboard courses included in and excluded from the study

Course ID	Number of Students enrolled	Number of Instructors	Number of users	Incl	Notes/ Reason for exclusion
1	21	3	24	1	
2	13	7	20	1	
3	17	5	22	1	
4	15	1	16	1	
5	265	3	268	1	
6	83	3	86	1	
7	138	1	139	1	
8	123	3	126	1	
9	36	3	39	1	
10	32	1	33	1	
11	12	2	14	1	
12	14	4	18	1	
13	59	1	60	1	
14	1	1	2	1	
15	14	2	16	1	
16	20	1	21	1	
17	4	2	6	1	
18	17	2	19	1	
19	85	2	87	1	
20		12	12	1	Included [55]
21		6	6	1	Included [5]
22	81	1	82	1	
23	17	2	19	1	
24	18	2	20	1	
25	18	2	20	1	
26	19	1	20	1	
27	14	1	15	1	
28	19	2	21	1	
29	19	2	21	1	
30	18	2	20	1	
31	21	2	23	1	

32	16	2	18	1
33	13	2	15	1
34	17	2	19	1
35	18	2	20	1
36	18	2	20	1
37	7	1	8	1
38	2	1	3	1
39	8	3	11	1
40	22	5	27	1
41	165	6	171	1
42	177	4	181	1
43	171	3	174	1
44	20	7	27	1
45	174	3	177	1
46	167	4	171	1
47	174	4	178	1
48	168	3	171	1
49	168	3	171	1
50	1	2	3	1
51	5	6	11	1
52	26	4	30	1
53	27	5	32	1
54	27	5	32	1
55	25	5	30	1
56	28	6	34	1
57	25	3	28	1
58	40	1	41	1
59	39	7	46	1
60	1	1	2	1
61	6	2	8	1
62	8	1	9	1
63	22	3	25	1
64	294	8	302	1
65	17	1	18	1
66	22	1	23	1
67	47	1	48	1
68	15	1	16	1
69	5	1	6	1

70	39	1	40	1	
71	10	1	11	1	
72	1	1	2	1	
73	31	1	32	1	
74	3	1	4	1	
75	4	1	5	1	
76	93	1	94	1	
77	3	1	4	1	
78	2	1	3	1	
79	29	1	30	1	
80	3	1	4	1	
81	33	2	35	1	
82	7	1	8	1	
83	10	1	11	1	
84	4	1	5	1	
85	16	1	17	1	
86	13	1	14	1	
87	22	1	23	1	
88	129	3	132	1	
89	28	10	38	1	
90	100	9	109	1	
91	5	9	14	1	
92	90	8	98	1	
93	11	7	18	1	
94	5	6	11	1	
95	10	1	11	1	
96	63	2	65	0	Persistent server error
97		1	1	0	No students, test course
98	40	2	42	0	Copy of another course
99	2	2	0	No students	
100	1	1	0	No students	
101	1	1	0	No students	
102	1	1	0	No students	
103	1	1	0	No students	
104	1	1	0	No students	
105	1	1	0	No students	
106	1	1	0	No students	

107		1	1	0	No students
108		1	1	0	No students
109	230	1	231	0	Persistent server error
110		1	1	0	No students
111		1	1	0	No students
Totals	4432	294	4726	95	

Appendix 12: Types and subtypes used to describe activity on Blackboard

NAME = entry obtained from the Blackboard database, each relating to a single user action.

TYPE = highest level generic category given by the author to describe the activity, used in charts and tables showing activity on the system (e.g. Figure 26).

SUBTYPE = more specific category to describe the action in more detail to understand the nature of activities across larger number of accesses.

Also shown is the version of blackboard (**Bbd version**) in which the names (activity "handlers") originated.

A total of 316 individual activity descriptions were observed in the database of which 199 (62.3%) were found to be "in use". The frequency of use is shown in descending order for each of these.

Bbd version		NAME	TYPE	SUBTYPE	FREQUENCY	PERCENT
V5	v6					
■		content2	Content	Content	588469	13.354
■		content1	Content	Content	210563	4.778
■		content3	Content	Content	183918	4.174
■		cp_content2	Admin	Content	89977	2.042
■		content4	Content	Content	68486	1.554
■		external_links	Content	Utilities	37487	0.851
■		cp_content3	Admin	Content	16151	0.367
■		tools_area	Student	Utilities	15340	0.348
■		discussion_board2	Communication	Discussion	13679	0.310
■		cp_external_links	Admin	Utilities	9780	0.222
■		group_pages	Group	Utilities	8699	0.197
■		cp_content4	Admin	Content	8643	0.196
■		cp_assessment_manager	Admin	Assessment	5533	0.126
■		cp_gradebook_byitem	Admin	Assessment	5498	0.125
■		cp_add_users	Admin	Users	5356	0.122
■		cp_pool_add_qstns	Admin	Assessment	5014	0.114
■		cp_assessment_builder	Admin	Assessment	4938	0.112
■		cp_assessment_add_qstns	Admin	Assessment	4756	0.108
■		browse_classroom_archives	Communication	Virtual_chat	4218	0.096
■		cp_online_gradebook	Admin	Assessment	2210	0.050
■		virtual_chat	Communication	Virtual_chat	2128	0.048
■		cp_assessment_set_availability	Admin	Assessment	1883	0.043
■		virtual_classroom	Communication	Virtual_chat	1796	0.041
■		cp_assessment_preview	Admin	Assessment	1286	0.029
■		cp_gradebook_byuser	Admin	Assessment	1207	0.027
■		cp_gradebook_spreadsheet	Admin	Assessment	1064	0.024
■		course_calendar	Student	Utilities	1032	0.023
■		enter_virtual_classroom	Communication	Virtual_chat	706	0.016
■		vc_browse_classroom_archives	Communication	Virtual_chat	636	0.014
■		cp_gradebook_views	Admin	Assessment	518	0.012
■		cp_assessment_create	Admin	Assessment	499	0.011
■		vc_enter_virtual_classroom	Communication	Virtual_chat	480	0.011
■		cp_pool_attach_file	Admin	Assessment	470	0.011
■		cp_assessment_attach_file	Admin	Assessment	414	0.009
■		cp_course_utilities	Admin	Courses	390	0.009
■		personal_edit	Student	Utilities	242	0.005
■		cp_survey_create	Admin	Assessment	194	0.004
■		cp_virtual_classroom	Admin	Virtual_chat	167	0.004
■		discussion_board?bbatt=y	Communication	Discussion	142	0.003
■		cp_browse_classroom_archives	Admin	Virtual_chat	133	0.003
■		group_enter_virtual_classroom	Group	Virtual_chat	112	0.003
■		cp_pool_export	Admin	Assessment	101	0.002
■		cp_academic_web_button_enable	Admin	Utilities	90	0.002
■		group_browse_classroom_archives	Group	Virtual_chat	68	0.002

■		cp_enter_virtual_classroom	Admin	Virtual_chat	61	0.001
■		cp_gradebook_export	Admin	Assessment	53	0.001
■		cp_course_marketing	Admin	Courses	45	0.001
■		discussion_board2?bbatt=y	Communication	Discussion	27	0.001
■		discussion_board 	Communication	Discussion	9	0.000
■		cp_discussion_board?bbatt=y	Communication	Communication	8	0.000
■		personal_privacy_options	Student	Utilities	6	0.000
■		cp_options_guest	Admin	Utilities	5	0.000
■		discussion_boardtarget=food	Communication	Discussion	5	0.000
■		discussion_board2?bbatt=y?bbatt=y	Communication	Discussion	3	0.000
■		admin_course_course_export	Admin	Courses	2	0.000
■		admin_course_course_recycle	Admin	Courses	1	0.000
■		check_grade?bbatt=y	Assessment	Assessment	1	0.000
■		enter_virtual_classroom?bbatt=y	Communication	Virtual_chat	1	0.000
■		ab_remove_contact	Admin	Utilities		
■		Communication Center	Communication	Communication		
■		Post Message	Communication	Communication		
■		Send Email	Communication	Communication		
■		Send Email(s)	Communication	Communication		
■		Send File to Group	Communication	Communication		
■		Send File to Instructor	Communication	Communication		
■		Send Group Email	Communication	Communication		
■		comm_discussion	Communication	Discussion		
■		Discussion Board	Communication	Discussion		
■		Access Group Area	Communication	Groups		
■		Virtual Chat Archives	Communication	Virtual_chat		
■		Virtual Chat Room	Communication	Virtual_chat		
■		Assignments	Content	Assessment		
■		Course Documents	Content	Content		
■		Course Information	Content	Content		
■		Course Information	Content	Content		
■		External Links	Content	Content		
■		Main Page	Content	Content		
■		Staff Information	Content	Content		
■		Search	Content	Utilities		
■		Group Homepages	Group	Content		
■		group_forum?bbatt=y	Group	Utilities		
■		Group Virtual Chat	Group	Virtual_chat		
■		Check Grade	Assessment	Assessment		
■		Change Your Information	Student	Utilities		
■		Student Homepages	Student	Utilities		
■		Student Roster	Student	Utilities		
■		Student Tools	Student	Utilities		
■	■	content	Content	Content	864262	19.613
■	■	announcements	Communication	Announcements	568269	12.896
■	■	discussion_board	Communication	Discussion	295544	6.707
■	■	cp_content	Admin	Content	153445	3.482
■	■	control_panel	Admin	Admin	118600	2.691
■	■	staff_information	Content	Content	56202	1.275
■	■	communication	Communication	Communication	55047	1.249
■	■	cp_announcements	Admin	Announcements	48172	1.093
■	■	cp_add_users_enroll	Admin	Enrollment	39367	0.893
■	■	groups	Group	Groups	32507	0.738
■	■	cp_list_modify_users	Admin	Users	31979	0.726
■	■	check_grade	Assessment	Assessment	24970	0.567
■	■	group_forum	Group	Communication	24377	0.553
■	■	send_email	Communication	Communication	18939	0.430
■	■	cp_manage_groups_add	Admin	Groups	16523	0.375
■	■	student_roster	Student	Utilities	15337	0.348
■	■	drop_box	Student	Utilities	14111	0.320
■	■	cp_discussion_board	Communication	Communication	12849	0.292
■	■	email_select_students	Communication	Communication	10959	0.249
■	■	tasks	Student	Utilities	10684	0.242
■	■	cp_course_options_area	Admin	Courses	10319	0.234
■	■	cp_staff_information	Admin	Content	10233	0.232
■	■	cp_digital_dropbox	Admin	Utilities	7654	0.174
■	■	cp_course_options	Admin	Courses	6942	0.158
■	■	cp_course_statistics	Admin	Courses	6901	0.157
■	■	group_file	Group	Utilities	6749	0.153
■	■	cp_manage_group	Admin	Groups	6573	0.149

■	■	cp_manage_groups	Admin	Groups	5355	0.122
■	■	cp_remove_users	Admin	Users	4602	0.104
■	■	cp_send_email	Communication	Communication	4463	0.101
■	■	email_all_users	Communication	Communication	3407	0.077
■	■	personal_info	Student	Utilities	2880	0.065
■	■	group_email	Group	Communication	2450	0.056
■	■	cp_tasks	Admin	Utilities	2443	0.055
■	■	address_book	Student	Utilities	2433	0.055
■	■	cp_send_email_select_students	Communication	Communication	2212	0.050
■	■	cp_course_images	Admin	Courses	2206	0.050
■	■	cp_course_options_avail	Admin	Courses	2178	0.049
■	■	cp_manage_groups_modify	Admin	Groups	2169	0.049
■	■	email_select_groups	Communication	Communication	1908	0.043
■	■	cp_send_email_all_users	Communication	Communication	1896	0.043
■	■	cp_modify_user	Admin	Users	1822	0.041
■	■	edit_homepage	Student	Utilities	1699	0.039
■	■	email_all_instructors	Communication	Communication	1610	0.037
■	■	cp_add_group	Admin	Groups	1568	0.036
■	■	cp_course_images_button	Admin	Courses	1350	0.031
■	■	cp_course_properties	Admin	Courses	1114	0.025
■	■	cp_course_images_banner	Admin	Courses	1088	0.025
■	■	email_all_ta	Communication	Communication	1085	0.025
■	■	cp_manage_groups_prop	Admin	Groups	1043	0.024
■	■	cp_send_email_select_groups	Communication	Communication	882	0.020
■	■	email_all_groups	Communication	Communication	611	0.014
■	■	group_virtual_classroom	Group	Virtual_chat	523	0.012
■	■	cp_course_options_enroll	Admin	Courses	520	0.012
■	■	cp_course_options_dur	Admin	Courses	461	0.010
■	■	cp_manage_groups_remove	Admin	Groups	426	0.010
■	■	cp_academic_web_button	Admin	Utilities	379	0.009
■	■	cp_course_utilities_recycler	Admin	Courses	341	0.008
■	■	cp_course_entry_point	Admin	Courses	295	0.007
■	■	personal_change_password	Student	Utilities	273	0.006
■	■	cp_pool_import	Admin	Assessment	228	0.005
■	■	cp_course_utilities_export	Admin	Courses	168	0.004
■	■	cp_add_users_create	Admin	Users	159	0.004
■	■	cp_send_email_all_instructors	Communication	Communication	127	0.003
■	■	cp_send_email_all_groups	Communication	Communication	90	0.002
■	■	personal_set_cdrom	Student	Utilities	74	0.002
■	■	ab_add_contact	Admin	Utilities	62	0.001
■	■	cp_send_email_all_ta	Communication	Communication	62	0.001
■	■	cp_add_users_batch	Admin	Users	40	0.001
■	■	ab_modify_contact	Admin	Utilities	1	0.000
	■	announcements_entry	Communication	Announcements	389102	8.830
	■	discussion_board_entry	Communication	Discussion	44491	1.010
	■	cp_content1	Admin	Content	42872	0.973
	■	course_tools_area	Admin	Utilities	25124	0.570
	■	cp_test_manager	Admin	Assessment	14969	0.340
	■	agroup	Admin	Groups	11874	0.269
	■	cp_gradebook	Assessment	Assessment	11477	0.260
	■	cp_survey_manager	Admin	Assessment	7585	0.172
	■	cp_pool_manager	Admin	Assessment	4986	0.113
	■	cp_gradebook_modifyGrade	Admin	Assessment	4857	0.110
	■	collaboration	Communication	Virtual_chat	2192	0.050
	■	admin_course_add_users	Admin	Users	2057	0.047
	■	cp_course_role_modify	Admin	Courses	1978	0.045
	■	admin_course_properties	Admin	Courses	1780	0.040
	■	admin_course_list_users	Admin	Users	1260	0.029
	■	cp_gradebook_item	Admin	Assessment	1159	0.026
	■	cp_manage_tools	Admin	Utilities	901	0.020
	■	cp_gradebook_viewGradesByItem	Admin	Assessment	832	0.019
	■	cp_course_options_area	Admin	Courses	832	0.019
	■	cp_gradebook_modifyOutcomeDefinition	Admin	Assessment	619	0.014
	■	cp_gradebook_manageOutcomeDefinitions	Admin	Assessment	521	0.012
	■	admin_modify_user_in_course	Admin	Users	405	0.009
	■	cp_tools_enable_bb	Admin	Utilities	379	0.009
	■	admin_course_remove_users	Admin	Users	319	0.007
	■	cp_collaboration	Admin	Virtual_chat	318	0.007
	■	cp_gradebook_user	Admin	Assessment	305	0.007
	■	cp_password_modify	Admin	Users	278	0.006

	■	cp_gradebook_gradebookSettings	Admin	Assessment	238	0.005
	■	cp_gradebook_viewGradesByUser	Admin	Assessment	198	0.004
	■	cp_course_options_area	Admin	Courses	198	0.004
	■	admin_course_course_properties	Admin	Courses	193	0.004
	■	admin_course_options	Admin	Courses	172	0.004
	■	cp_gradebook_itemGrades	Admin	Assessment	169	0.004
	■	cp_copy_course	Admin	Courses	163	0.004
	■	cp_tools_enable_content	Admin	Content	140	0.003
	■	modify_user_role	Admin	Users	135	0.003
	■	cp_gradebook_downloadGrades	Admin	Assessment	123	0.003
	■	cp_course_export	Admin	Courses	115	0.003
	■	cp_course_classify	Admin	Courses	113	0.003
	■	cp_gradebook_itemInfo	Admin	Assessment	112	0.003
	■	admin_course_course_availability	Admin	Courses	108	0.002
	■	cp_options_observer	Admin	Utilities	90	0.002
	■	cp_gradebook_itemReport	Admin	Assessment	87	0.002
	■	cp_gradebook_manageScales	Admin	Assessment	87	0.002
	■	cp_package_import	Admin	Utilities	79	0.002
	■	cp_gradebook_weightGrades	Admin	Assessment	77	0.002
	■	cp_gradebook_displaySettings	Admin	Assessment	75	0.002
	■	cp_tools_enable_ext	Admin	Utilities	71	0.002
	■	cp_gradebook_manageCategories	Admin	Assessment	61	0.001
	■	admin_course_enrollment_options	Admin	Enrollment	41	0.001
	■	admin_course_course_duration	Admin	Courses	35	0.001
	■	cp_gradebook_userReport	Admin	Assessment	29	0.001
	■	cp_send_email_select_observers	Communication	Communication	29	0.001
	■	email_select_observers	Communication	Communication	29	0.001
	■	cp_gradebook_userInfo	Admin	Assessment	28	0.001
	■	cp_course_utilities_cartridge_add	Admin	Courses	26	0.001
	■	delete_user_from_course	Admin	Users	25	0.001
	■	cp_gradebook_modifyScales	Admin	Assessment	24	0.001
	■	password_modify	Admin	Users	22	0.000
	■	categorize_courses	Admin	Courses	20	0.000
	■	admin_course_course_categories	Admin	Courses	18	0.000
	■	cp_send_email_all_observers	Communication	Communication	18	0.000
	■	email_all_observers	Communication	Communication	18	0.000
	■	cp_gradebook_modifyCategory	Admin	Assessment	15	0.000
	■	cp_gradebook_uploadGradebook	Admin	Assessment	15	0.000
	■	enroll_accept	Admin	Enrollment	15	0.000
	■	list_users	Admin	Users	14	0.000
	■	electric_blackboard	Student	Utilities	11	0.000
	■	admin_course_guest_access	Admin	Users	9	0.000
	■	admin_course_course_utilities	Admin	Courses	6	0.000
	■	admin_course_enrollment_fees	Admin	Enrollment	4	0.000
	■	admin_course_course_images	Admin	Utilities	4	0.000
	■	admin_course_button_style	Admin	Utilities	3	0.000
	■	admin_main	Admin	Admin		
	■	archive_course	Admin	Courses		
	■	batch_create_courses	Admin	Courses		
	■	classic_course_catalog	Admin	Courses		
	■	copy_course	Admin	Courses		
	■	course_catalog	Admin	Courses		
	■	course_disk_quotas	Admin	Courses		
	■	course_images	Admin	Courses		
	■	course_props_areas	Admin	Courses		
	■	course_props_defaults	Admin	Courses		
	■	course_props_design	Admin	Courses		
	■	course_role_rename	Admin	Courses		
	■	course_select_icons	Admin	Courses		
	■	course_set_course_images	Admin	Courses		
	■	course_settings	Admin	Courses		
	■	create_course	Admin	Courses		
	■	cust_classic_course_catalog	Admin	Courses		
	■	en_course_creation	Admin	Courses		
	■	export_course	Admin	Courses		
	■	import_course	Admin	Courses		
	■	list_courses	Admin	Courses		
	■	list_courses_by_user	Admin	Courses		
	■	manage_course_catalog	Admin	Courses		
	■	remove_course	Admin	Courses		

	■	restore_course	Admin	Courses		
	■	batch_enroll_org	Admin	Enrollment		
	■	batch_enroll_users	Admin	Enrollment		
	■	enroll_course	Admin	Enrollment		
	■	batch_create_users	Admin	Users		
	■	batch_remove_users	Admin	Users		
	■	create_user	Admin	Users		
	■	cust_user_profile	Admin	Users		
	■	remove_user	Admin	Users		
	■	user_directory	Admin	Users		
	■	user_management_links	Admin	Users		
	■	user_properties	Admin	Users		
	■	admin_course_course_quotas	Admin	Utilities		
	■	admin_course_enable_tools	Admin	Utilities		
	■	admin_course_statistics	Admin	Utilities		
	■	admin_logfiles	Admin	Utilities		
	■	admin_plugin_install	Admin	Utilities		
	■	admin_plugin_manage	Admin	Utilities		
	■	authentication_config	Admin	Utilities		
	■	cart_import	Admin	Utilities		
	■	config_logfiles	Admin	Utilities		
	■	cust_login_page	Admin	Utilities		
	■	frame_options	Admin	Utilities		
	■	gateway_options	Admin	Utilities		
	■	institution_properties	Admin	Utilities		
	■	integration_passwd	Admin	Utilities		
	■	login_key	Admin	Utilities		
	■	mail_logfiles	Admin	Utilities		
	■	modify_tab	Admin	Utilities		
	■	modify_tab_module_content	Admin	Utilities		
	■	modify_tab_module_layout	Admin	Utilities		
	■	modify_tab_properties	Admin	Utilities		
	■	observer_mgmt	Admin	Utilities		
	■	observer_mod	Admin	Utilities		
	■	pa_manage_modules	Admin	Utilities		
	■	pa_manage_tabs	Admin	Utilities		
	■	pa_manage_toolbar	Admin	Utilities		
	■	pa_settings	Admin	Utilities		
	■	pa_settings_top_frame	Admin	Utilities		
	■	registration_info	Admin	Utilities		
	■	send_stats	Admin	Utilities		
	■	ssl_choice	Admin	Utilities		
	■	system_info	Admin	Utilities		
	■	system_reports	Admin	Utilities		
	■	system_settings	Admin	Utilities		
	■	system_statistics	Admin	Utilities		
	■	inst_announcements	Communication	Announcements		
	■	email_all_system_students	Communication	Communication		
	■	email_all_system_users	Communication	Communication		
	■	inst_email	Communication	Communication		
	■	search_courses	Content	Utilities		
	■	my_announcements	Student	Announcements		
	■	my_grades	Assessment	Assessment		
	■	my_email_courses	Student	Communication		
	■	my_inst_personal_change_password	Student	Utilities		
	■	my_inst_personal_edit	Student	Utilities		
	■	my_inst_personal_info	Student	Utilities		
	■	my_inst_personal_privacy_options	Student	Utilities		
	■	my_inst_personal_set_cdrom	Student	Utilities		
	■	my_tasks	Student	Utilities		
	■	cp_gradebook_displaySettings	Admin	Assessment		
	■	cp_gradebook_weightGrades	Admin	Assessment		

Appendix 13: Qualitative data – nodes

Table 18: Most popular Nodes coded in the qualitative data (all nodes used to code 6 or more passages)

Number Passages Coded	Node title (N=170)	Doc count	Passages per coded document
34	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Features/Dialogue	13	2.62
29	Current uses of Bbd/Modes/Virtual Filing Cabinet	13	2.23
28	Issues with using Bbd/Student-User-related/Involvement of students	8	3.50
28	Current uses of Bbd/Modes/Online discussion	11	2.55
25	Current uses of Bbd/Modes/Assessment	11	2.27
25	Issues with using Bbd/Technology-related/Features of Bbd/Tools/Discussion Board	15	1.67
23	Issues with using Bbd/Institution-related/Support Services/LTSS/Role of LTSS	8	2.88
23	Issues with using Bbd/Pedagogy-related/Affordances/as a virtual filing cabinet	9	2.56
21	Issues with using Bbd/Teacher-Staff-related/Demands on teacher/Teacher workload	9	2.33
21	Issues with using Bbd/Pedagogy-related/Usage/Modes of use/Communication Areas	13	1.62
21	Issues with using Bbd/Policy & strategy/Future uses of VLEs	11	1.91
20	Issues with using Bbd/Teacher-Staff-related/Teacher support/Staff development	12	1.67
19	Issues with using Bbd/Pedagogy-related/Usage/Modes of use/Content Areas	10	1.90
18	Issues with using Bbd/Policy & strategy/Strategy/Bespoke vs Commercial	11	1.64
17	Issues with using Bbd/Teacher-Staff-related/Involvement of staff/Getting colleagues to use it	9	1.89
17	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Role of students/Participation	12	1.42
15	Issues with using Bbd/Teacher-Staff-related/Teacher traits/Teacher expectations of VLE	10	1.50
15	Issues with using Bbd/Implementation-related/Support issues/support/Teacher support	7	2.14
15	Issues with using Bbd/Pedagogy-related/Affordances/as an assessment tool	10	1.50
14	Why use Bbd~/Interaction/Discussion Board	3	4.67
14	Issues with using Bbd/Implementation-related/Management of change/Changing our ways of doing things	8	1.75
14	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Features/Support	8	1.75
14	Issues with using Bbd/Institution-related/Choice of software tools/VLEs	9	1.56
14	VLE + other software/Blackboard/Level 2	9	1.56
13	Issues with using Bbd/Teacher-Staff-related/Involvement of staff	6	2.17
13	Issues with using Bbd/Policy & strategy/Strategy/Choice of BBD/BBD Replacement	6	2.17
13	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Effectiveness of Learning/supporting the learning process	8	1.63
13	Current uses of Bbd/Ways/Most constructive	9	1.44
13	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Features/Control	9	1.44
12	Issues with using Bbd/Technology-related/Administrivia/Enrolment	8	1.50
12	Issues with using Bbd/Technology-related/Bbd Interface/Navigation	7	1.71
12	VLE + other software/VLE/WebCT	4	3.00
12	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Activities/Teacher Controlled/Specified Tasks	8	1.50
12	Issues with using Bbd/Institution-related/Compared with other institutions	6	2.00
12	Issues with using Bbd/Pedagogy-related/Affordances/as a communication tool	7	1.71
12	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Specifications/Balance of features	7	1.71
12	Issues with using Bbd/Teacher-Staff-related/Involvement of staff/Differential use by staff	7	1.71
12	Issues with using Bbd/Pedagogy-related/Affordances/as an information source	8	1.50
12	Issues with using Bbd/Policy & strategy/Strategy/Choice of BBD/Nursery Slope	8	1.50
12	Issues with using Bbd/Policy & strategy/Strategy/University Portal	8	1.50
12	Issues with using Bbd/Technology-related/Features of Bbd/Tools/Email	8	1.50
11	Issues with using Bbd/Teacher-Staff-related/Teacher support	5	2.20
11	Issues with using Bbd/Technology-related/Features of Bbd/Uploading	6	1.83
11	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Features/Involvement	8	1.38
11	Issues with using Bbd/Implementation-related/Support issues/support/Technical Support	6	1.83
11	Issues with using Bbd/Pedagogy-related/Usage/Level of use/Basic or low level	6	1.83
11	Issues with using Bbd/Pedagogy-related/Design/Integration/with other teaching	7	1.57
11	Issues with using Bbd/Technology-related/Features of Bbd/Tools/Assessment	7	1.57
11	Issues with using Bbd/Pedagogy-related/Affordances/as a one-stop-shop	9	1.22

10	Issues with using Bbd/Pedagogy-related/Affordances	1	10.00
10	Issues with using Bbd/Technology-related/Integration/Computing systems/Student Records	7	1.43
10	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Teaching Portal/Bbd - Portal relationship/BBD vs the Portal	5	2.00
9	Issues with using Bbd/Teacher-Staff-related/Demands on teacher	5	1.80
9	Issues with using Bbd/Pedagogy-related/Relationship to students	3	3.00
9	Issues with using Bbd/Implementation-related/Implementation/Suck-it-and-see approach	4	2.25
9	Issues with using Bbd/Pedagogy-related/Affordances/Interaction	4	2.25
9	Issues with using Bbd/Student-User-related/Student perceptions/Managing expectations	5	1.80
9	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Activities/Learner Managed/Open Ended Strategic	6	1.50
9	Issues with using Bbd/Policy & strategy/Strategy/Co-ordination/Joined-up thinking	7	1.29
8	Why use Bbd~/Learning/Learning support	2	4.00
8	Issues with using Bbd/Institution-related/Culture/Cultures	3	2.67
8	VLE + other software/Blackboard	3	2.67
8	Issues with using Bbd/Technology-related/Features of Bbd/Course Management tools/Site management/Inflexibility	5	1.60
8	Issues with using Bbd/Implementation-related/Implementation/Uptake/Uptake by staff	5	1.60
8	Why use Bbd~/Size of student population/Large~ over 150 per year	5	1.60
8	Issues with using Bbd/Implementation-related/VIOLET	3	2.67
8	Issues with using Bbd/Pedagogy-related/Class size	4	2.00
8	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Teaching Portal	4	2.00
8	Why use Bbd~/Assessment/Formative	4	2.00
8	Issues with using Bbd/Implementation-related/Implementation/Consultation	5	1.60
8	Issues with using Bbd/Implementation-related/Implementation/Uptake/Uptake by staff/Seeing the benefits	5	1.60
8	Issues with using Bbd/Pedagogy-related/Design/Integration/into the curriculum	5	1.60
8	Issues with using Bbd/Pedagogy-related/Usage/Measuring usage	5	1.60
8	Issues with using Bbd/Policy & strategy/Strategy/Co-ordination	5	1.60
8	Current uses of Bbd/Ways/Least constructive	6	1.33
8	Issues with using Bbd/Policy & strategy/Uncertainty	6	1.33
8	Issues with using Bbd/Technology-related/Features of Bbd/Tools/Virtual Classroom	6	1.33
8	Issues with using Bbd/Technology-related/Features of Bbd/Usefulness/Most	6	1.33
8	Issues with using Bbd/Technology-related/Integration/Local systems/Dept-School-Faculty Intranets	7	1.14
8	Issues with using Bbd/Policy & strategy/Strategy/Co-ordination/Negotiation	8	1.00
7	Issues with using Bbd/Institution-related/Centralisation/Centralisation and loss of control	4	1.75
7	Issues with using Bbd/Technology-related/Bbd Interface/Structure/Confusion	5	1.40
7	Issues with using Bbd/Technology-related/Features of Bbd/Course Management tools/Site management	2	3.50
7	Issues with using Bbd/Institution-related/Support Services/LTSS	3	2.33
7	Issues with using Bbd/Pedagogy-related/Group dynamics	2	3.50
7	Issues with using Bbd/Teacher-Staff-related/Administrative support/Secretarial	4	1.75
7	Why use Bbd~/Geographic distribution/Students	5	1.40
7	Issues with using Bbd/Institution-related/Resources/Pressure on resources	3	2.33
7	Why use Bbd~/Skills/Computer Skills	3	2.33
7	Current uses of Bbd/Modes/Distance learning support	4	1.75
7	Issues with using Bbd/Implementation-related/Implementation/Top-down approach	4	1.75
7	Issues with using Bbd/Policy & strategy/Policy/Departmental	4	1.75
7	Issues with using Bbd/Technology-related/Features of Bbd/Tools/External Links	5	1.40
7	Issues with using Bbd/Pedagogy-related/Affordances/as a group project work area	5	1.40
7	Issues with using Bbd/Student-User-related/Requirements made on students/Changing ways students work or study	5	1.40
7	Issues with using Bbd/Technology-related/Software/Ease of use	6	1.17
7	Issues with using Bbd/Implementation-related/Implementation/Barriers	2	3.00
6	Why use Bbd~/Interaction/Collaboration	5	1.20
6	Issues with using Bbd/Pedagogy-related/Affordances/as a discussion tool	6	1.00
6	Issues with using Bbd/Technology-related/Hardware/Access to facilities	2	3.00
6	Issues with using Bbd/Technology-related/Bbd Interface/Structure	3	2.00
6	Issues with using Bbd/Technology-related/Software/Assumptions of software	4	1.50
6	Current uses of Bbd/Level/Postgraduate	4	1.50
6	Issues with using Bbd/Implementation-related/Implementation/How to implement~	4	1.50
6	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Activities/Teacher Controlled/Open Ended Strategic		

6	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Features/Support/Scaffoding	4	1.50
6	Issues with using Bbd/Student-User-related/Student feedback	5	1.20
6	Issues with using Bbd/Policy & strategy/Strategy/Choice of BBD	2	3.00
6	Why use Bbd~/Teaching/Provision of teaching resources	2	3.00
6	Issues with using Bbd/Institution-related/Support Services/Working together	3	2.00
6	Issues with using Bbd/Institution-related/Support Services/Working together/Conflict	3	2.00
6	Issues with using Bbd/Student-User-related/Student support/Training for students	3	2.00
6	Issues with using Bbd/Teacher-Staff-related/Demands on teacher/Teacher workload/Perceptions and fear of workload	3	2.00
6	Issues with using Bbd/Teacher-Staff-related/Teacher traits/Teacher conservatism	3	2.00
6	Issues with using Bbd/Pedagogy-related/Usage/Creative uses of BBd/Lack of innovation	4	1.50
6	Issues with using Bbd/Teacher-Staff-related/Teacher support/Staff development/Pedagogy for online teaching	4	1.50
6	Why use Bbd~/Interaction/Promotion of interaction	4	1.50
6	Issues with using Bbd/Implementation-related/Support issues	5	1.20
6	Issues with using Bbd/Pedagogy-related/Affordances/as curriculum overview	5	1.20
6	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Features/Involvement/Engagement	5	1.20
6	Issues with using Bbd/Policy & strategy/Future uses of VLEs/More imaginative uses	6	1.00
6	Issues with using Bbd/Policy & strategy/Strategy/Choice of BBD/BBD Replacement/is it worth using~	6	1.00
6	Issues with using Bbd/Teacher-Staff-related/Involvement of staff/Barriers	6	1.00
5	Issues with using Bbd/Problems	1	5.00
5	Issues with using Bbd/Implementation-related/Implementation	2	2.50
5	Issues with using Bbd/Implementation-related/Support issues/support/Departmentally based support	3	1.67
5	Issues with using Bbd/Pedagogy-related/Affordances/as a discussion tool/Facilitating discussion	4	1.25
5	Why use Bbd~/Learning/Promotion of learning	2	2.50
5	Issues with using Bbd/Institution-related/Support Services/LTSS/LTSS Advisory Group	3	1.67
5	Issues with using Bbd/Policy & strategy/Future uses of VLEs/Need for research	2	2.50
5	Issues with using Bbd/Student-User-related/ICT skills	4	1.25
5	Issues with using Bbd/Teacher-Staff-related/Staff reward and appreciation	4	1.25
5	Issues with using Bbd/Technology-related/Features of Bbd/Course Management tools/Moving files and folders/Clumsy	4	1.25
5	Why use Bbd~/Assessment	4	1.25
5	Issues with using Bbd/Teacher-Staff-related/Administrative support/Reducing administrative load	5	1.00
5	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Specifications/Personalisation	1	5.00
5	Issues with using Bbd/Policy & strategy/Drivers for using VLE/Not centrally driven	2	2.50
5	Issues with using Bbd/Student-User-related/Involvement of students/Uptake of Bbd	2	2.50
5	Quotes/CONCRETE EXAMPLE	2	2.50
5	VLE + other software/Blackboard/What's special about Blackboard~	2	2.50
5	Issues with using Bbd/Implementation-related/Implementation/Uptake/Uptake by students	3	1.67
5	Issues with using Bbd/Institution-related/Support Services/LTSS/Small team	3	1.67
5	Issues with using Bbd/Pedagogy-related/Affordances/as an orientation site	3	1.67
5	Issues with using Bbd/Policy & strategy/Strategy/Choice of BBD/BBD Replacement/Exit strategy/reproviding features	3	1.67
5	Issues with using Bbd/Teacher-Staff-related/Innovators/New methods unpopular	3	1.67
5	Issues with using Bbd/Teacher-Staff-related/Teacher traits/Teacher resistance	3	1.67
5	Issues with using Bbd/Technology-related/Access to site	3	1.67
5	Issues with using Bbd/Technology-related/Administrivia/Enrolment/Enrolment process	3	1.67
5	Current Experience of Bbd/Creating a BBD course/Created 1st	4	1.25
5	Issues with using Bbd/Institution-related/Culture/Teaching-Research divide	4	1.25
5	Issues with using Bbd/Institution-related/Resources/Cost/TCO	4	1.25
5	Issues with using Bbd/Institution-related/Support Services/ISER/Tension bx service and innovation	4	1.25
5	Issues with using Bbd/Pedagogy-related/Affordances/as a teaching tool	4	1.25
5	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Activities/Learner Managed/Specified Tasks	4	1.25
5	Issues with using Bbd/Pedagogy-related/Learning Paradigm/Role of students/Knowledge Acquisition	4	1.25
5	Issues with using Bbd/Policy & strategy/Strategy/e-learning strategy	4	1.25

5	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Perceptions of the Portal/Integration of features - confusion	4	1.25
5	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Specifications/Balance of features/Tension between VLE and MLE	4	1.25
5	Issues with using Bbd/Student-User-related/Requirements made on students/Shifting the cost of printing	4	1.25
5	Issues with using Bbd/Student-User-related/Student perceptions/VLE	4	1.25
5	Issues with using Bbd/Technology-related/Integration/Computing systems	4	1.25
5	Issues with using Bbd/Technology-related/Integration/Computing systems/Management Information	4	1.25
5	Current Experience of Bbd/Creating a BBD course	5	1.00
5	Issues with using Bbd/Pedagogy-related/Affordances/as a tutorial tool	5	1.00
5	Issues with using Bbd/Policy & strategy/Strategy/Bespoke vs Commercial/TCO/Development cost	5	1.00
5	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Portal Wars	5	1.00
5	Issues with using Bbd/Policy & strategy/Strategy/University Portal/Specifications/Must be very high quality	5	1.00
5	Issues with using Bbd/Student-User-related/Student perceptions/Student demand	5	1.00

Appendix 14: Codes located by second reader

Area, Category:	Number of documents in which codes were located	Occurrences found by second reader	Match codes from current study (86.2%)
1. GENERAL USES OF BLACKBOARD			
Lecture notes (via tutor)	5	9	1
Discussion boards	5	6	1
Tutorials	4	6	1
Virtual filing cabinet	3	5	1
Web uses	4	4	1
Course information	3	4	1
Material storage	3	3	1
Course administration	3	3	1
Masters courses	3	3	
Student support (on and off campus)	3	3	1
Discussion groups	2	3	1
On-line chat between participating course students	2	3	1
Assessment	2	2	1
Student tracking	2	2	1
Announcements	2	2	1
Distribution of course materials	2	2	1
Resources room	2	2	1
Mailing tool	1	2	1
Web C. T.	1	2	
Student attendance	1	2	
Posting documents	1	1	1
Navigation vehicle for courses	1	1	1
Student feedback	1	1	1
Powerpoint	1	1	1
Interactive projects	1	1	1
Digital drop-box	1	1	1
Handouts	1	1	1
Course questionnaire	1	1	1
Student questionnaire	1	1	1
2. SPECFIC USES OF BLACKBOARD			
Discussion boards	4	8	1
Interaction with students	2	4	1
Workshops (staff- training)	2	2	1
Peer learning	2	2	1
Information "gateway"	1	2	1
Quiz's and tests	1	1	1
Student reflection purposes	1	1	
Workshops	1	1	1
Student presentations via Powerpoint	1	1	
Independent learning	1	1	1
Exam practice	1	1	1
Exam knowledge	1	1	1
Communication purposes with students off campus	1	1	1
Understanding ICT and its applications through project work	1	1	1

Case analysis	1	1	
Support and supplement to lecture notes	1	1	1
As a 'compliment' to face-to-face teaching	1	1	1
3. ASSESSMENT USES THROUGH BLACKBOARD			
Exam practice	2	3	1
Model case study presentations	2	2	
Quiz's	2	2	1
Model essays	1	1	1
Self-assessment by students	1	1	
Email submission and grades	1	1	1
Supporting distance learning students	1	1	1
Full potential of Blackboard as an assessment tool not being realised	1	1	1
Assessment via Blackboard too labour intensive	1	1	1
Assessment tool not useful	1	1	1
Tutorial questions via discussion board	1	1	1
4. IMPLEMENTATION ISSUES ASSOCIATED WITH THE ESTABLISHMENT OF BLACKBOARD			
Specific staff training requirements, as differentiated by the variety of needs in university departments	4	6	1
Limited training opportunities for staff as current and future users	4	4	1
Lack of cohesion in use of BB	3	3	1
Where do support staff 'fit' in?	2	3	1
Administrative staff need to embrace BB	1	3	1
Cost factors - is Blackboard cost effective?	2	2	1
Staffing issues - adequate numbers of support staff employed to ensure the effective operation of Blackboard.	2	2	1
More user needs analysis required	2	2	1
Future of BB at the university	2	2	1
Developed BB product comparable to other VLE's	2	2	1
Opposition to BB	1	2	1
Communication issues between departments	1	1	
Communication issues between senior university management and staff concerning the rationale, purpose and demands of Blackboard	1	1	1
Ownership issues	1	1	1
Concerns that Bristol's use of BB lags behind other users	1	1	1
Concerns over Bristol's choice of portal frameworks	1	1	1
What is the role of academics in the use of BB - what is their domain?	1	1	1
Student access to computers	1	1	1
Lack of coherent strategic planning in process-particularly implementation	1	1	1
People not prepared to invest time to acquire skills necessary for BB use	1	1	1
Technicians need to be fully competent with BB	1	1	1
'Techno-phobia' amongst staff	1	1	1
'Bolt-on' approach to BB - little integration with existing systems	1	1	1
Integrational problems	1	1	1
BB should be more customisable with better interfaces - need to investigate this	1	1	1
Responsibility for student enrolment on courses-admin-who?	1	1	1
Need for user groups to meet	1	1	1
Drop-in sessions (surgery type) to share practice	1	1	
5. ADVANTAGES AND STRENGTHS IDENTIFIED IN THE USE OF BLACKBOARD			
Teacher communicating with students via BB a unique experience	1	1	1

Ease of loading materials	1	1	1
Less marking - time saved by staff	1	1	1
The ability to download documents Word etc, and display them within the BB frame set	1	1	1
A means by which courses can logistically cater for larger numbers of students	1	1	1
Lecturers encouraged to reassess their teaching and learning strategies	1	1	1
Gives students greater access to materials/recourses	1	1	1
Course announcements - BB saves time for secretaries and reduces 'paper chain'	1	1	1
6. PROBLEMS AND WEAKNESSES IDENTIFIED WITH THE USE OF BLACKBOARD			
Access to BB variable at different sites	2	3	1
Logistical problems with larger groups of students using BB	1	3	1
Potential of BB not realised at the university due to a variety of reasons	2	2	1
Students who are not sufficiently computer literate unable to search through electronic journals	1	2	1
Lack of use (relative)	1	1	1
Technical problems with Datahub - does not have information needed to populate BB	1	1	1
Ownership issues	1	1	1
Assessment - student logistical issues	1	1	1
File display not clear e.g. unlike Windows Explorer	1	1	1
CPD component - students experiencing some problems receiving information	1	1	
Organisational problems related to the use of BB admin to match student numbers?	1	1	1
BB displays student scores at the end of tests contravening university examination regulations in doing so	1	1	1
BB unable to allocate proportional scores on multiple choice questions when used	1	1	1
Assessment tools stated as not being useful	1	1	1
Difficulties (software) in recording student grades	1	1	1
Student registration process cumbersome	1	1	1
External links very unhelpful	1	1	1
Assessment timing facility - cannot cater for students granted extra time for examinations	1	1	1
Translation problems (languages dept)	1	1	
Structure of website - difficulties in moving (around), and changing folders	1	1	1
Difficulties in 'hiding' information from students using BB until they are required to access it at a specific point in a course	1	1	1
Lecturers post announcements via BB unfiltered by secretaries - mistakes can occur	1	1	
Some resistance to BB as a standardising aspect - some staff feel that BB is a potentially centralising (controlling) element on teaching activities	1	1	1
Inflexibility and 'ugliness' of presentation of BB	1	1	1
'Techno problems"	1	1	1

Appendix 15: Rammert's "New rules of sociological method: rethinking technology studies"

The following 12 rules (developed by Rammert, from Giddens) are quoted from Werner Rammert's paper describing them (Rammert, 1997). Emphasis added.

1. **Technologies** are *social facts* and *sociological subjects* in so far as they are products of previous social activity. They should be considered more generally as '*techno-structures*' within the stream of social action rather than single and separate material means outside of society (p173).
2. **Techno-structures** should be analysed as *socially constructed realities* which are constituted and produced by the action of subjects (Giddens 1984:197) rather than a taken-for-granted world of material objects. Techno-structures result from actors' structuration capacities which are based on their *competence in creative action and routine formation.* Techno-structures not only constrain further human action , but also enable and enforce it (p174).
3. **Technology** should be defined *relationally* as a **particular social process of relating things, signs and humans in order to cause controlled results**, instead of only by its physical aspects and the ramifications thereof. It should be defined *pragmatically* as **active construction of tools-in-use and technologies-in-contexts**, not instrumentally as an ensemble of material means for specific purposes (p176).
4. Just like techno-structures, **technological advancement** should be deconstructed into its *constituting elements* and *generating processes.* It can be reconstructed as a *continuous flow* of technicization and as a *contingent chain* of technological developments. What are the constituting elements of technological advancement? In the analytical philosophy of technology, technical progress is broken down into acts of 'problem solving' and 'decisions about options'...(p178).
5. **Technology development** should be deconstructed into specific **local technology projects** where techno-structures are conceived, constructed and negotiated... The designs combine particular visions of technical practice... activities of inquiry and innovative action...(p179).
6. **Technical efficiency** and **technological superiority** should be treated as *socially constructed* and *open to social interpretation* (p180).
7. The **design variability** of techno-structures completes the interpretive flexibility. We should identify the whole spectrum of projects in a technological field which propose different designs... When faith in the 'one-best-way' principle is shaken, then a wide variety of technical designs have to be taken into consideration (p181-182: i.e. not one size fits all).
8. Technological artefacts are only successful in the framework of a techno-structure. The **successful formation of a techno-structure** should be reconstructed as a temporary result of the **micro-politics of negotiation** between local actors and the **macro-social networking** between collective actors representing the different institutional fields of society. The social closure of a controversy is but one mechanism of stabilization.
9. **The development of a techno-structure** should be viewed as a **recursive process**; it does not follow a linear and sequential pattern of evolution from the generation of an idea to the diffusion of an innovation. Technology projects always change when they enter a new institutional field. These changes should be analysed in terms of **translations between different rule systems** and in terms of **co-ordinations in conflict arenas and in networks** constituted by actors from different institutional fields (p182). *Negotiation processes* take place within organisations between representatives of different social worlds. Roles and programmes concerning design, implementation and use of new technologies are negotiated between professional groups...(p183)
10. **The formation of techno-structures and the association of actor-networks** can be subjected to strategical analysis on a local level and with a short term perspective but in the long run and on the global level the structuration process should be treated as 'blind variation' because of its **blindness to long term effects** and of its **unintended consequences** (p183-4).
11. If **continuities and discontinuities of technical development** cannot be sufficiently explained by either the aggregation of decisions, or the connection of situations on the local level, then the global dynamics of technical development should be reconstructed with a social-cultural concept of evolution which allows for analysis of **institutionalized mechanisms of productive variation, structural selection, and reproductive stabilization** (p184).
12. **Technical change** neither results from a structural logic that operates beyond the scope of social actors, as Durkheim's first rule may suggest, nor is it entirely open to voluntary action and various constructions of technology, as social constructivism may suggest.

Notes

[1] http://www.bris.ac.uk/tsu/lta/funding/ltawards.html

[2] http://www.blackboard.com

[3] In particular, the Joint Information Services Committee (JSIC: http://www.jisc.ac.uk/), Learning and Teaching Support Network (LTSN: http://www.ltsn.ac.uk/) and more recently the Higher Education Academy (HEA: http://www.heacademy.ac.uk/)

[4] "e-learning" is "The delivery of learning or training using electronically-based approaches – mainly through the Internet, intranet, extranet or Web" (Sloman, 2001).

[5] see 0 for one which does include these aspects.

[6] The 'VIOLET' project: "Virtual Integrated On-Line Environment for Teaching".

[7] The Internet can be defined as the "global collective of computer networks" – millions of inter-connected computers and associated hardware, whereas the Web is "One of the most commonly used parts of the Internet (along with email and ftp) - a vast network of information resources held on Web sites and Web pages, all of which have been built using the Hypertext Transfer Protocol (HTTP)" (Ross, 2000). Thus the Web is about inter-connected documents (or 'objects') and the Internet is about inter-connected hardware. Latterly the Web has become more about services than documents, however,

[8] There were 285,139,107 host computers in the Internet by Jul 2004 following a steep growth since 1994 which increased pace in 1999-2002 an d again in 2003-4 (http://www.isc.org/index.pl?/ops/ds/).

[9] http://www.rdn.ac.uk/

[10] BIOME (http://biome.ac.uk/), EEVL (http://www.eevl.ac.uk/), SOSIG (http://www.sosig.ac.uk/) and 'Health on the Net' (http://www.hon.ch/)

[11] Macromedia Dreamweaver, Microsoft Front Page, and various other packages now offer easy to learn graphical interfaces for the production not only of Web pages but of entire Web sites. Link checking, dynamic content and even interaction with information held in databases are all offered using these tools in ways requiring minimal technical knowledge.

[12] Examples of Weblogs may be found at http://www.globeofblogs.com/ and http://www.weblogs.com/

[13] See http://www.w3.org/ for descriptions of the various technologies.

[14] See http://www.service-architecture.com/, http://webservices.xml.com/pub/a/ws/2003/09/30/soa.html for descriptions and definitions of Service Oriented Architecture (SOA).

[15] Definition: "*Said of a system (e.g., program, file format, programming language, protocol, etc.) designed to easily allow the addition of new features at a later date*" (http://www.w3.org/TR/webarch/#extensibility)

16 Examples include Universities UK http://www.universitiesuk.ac.uk/, Michigan Virtual University http://www.mivu.org/, Pearson VUE http://www.vue.com/, http://www.avu.org/default.asp, and the Canadian Virtual University http://www.cvu-uvc.ca/.

17 http://www.unesco.org/webworld/portal_freesoft/Software/Courseware_Tools/

18 JISC have conducted various interoperability and feasibility pilots of MLEs in further and higher education: see http://www.jisc.ac.uk/mle

19 Some interoperability issues are discussed on the JISC Web page "Standards and Specifications: Why Use IMS?" http://www.jisc.ac.uk/index.cfm?name=mle_briefings_4

20 The needs of a particular course, means of communication, provision for practical work, interactive demonstrations.

21 Mark Stiles' article "Effective Learning and the Virtual Learning Environment" (Stiles 2000) can be viewed on the Web at http://www.staffs.ac.uk/COSE/cose10/posnan.html (last accessed 03/12/2004).

22 Gilly Salmon's five-step approach to becoming an 'e-moderator' (see http://oubs.open.ac.uk/e-moderating/fivestep.htm) is now a well known and easy to apply model that has a good grounding in research. Models such as these could form core parts of a staff development policy to support greater use of e-learning.

23 http://www.ngfl.gov.uk/index.jsp

24 http://www.learndirect.co.uk/

25 http://www.open2.net/

26 Key Stage 4 pupils, i.e. those preparing for GCSEs, aged between 14 and 16.

27 From the text of Illitch's book at http://homepage.mac.com/tinapple/illich/1970_deschooling.html

28 Institutions often have a system of grants to allocate annually to small teaching and learning projects. Those focussing on e-Learning at Bristol are listed at: http://www.bris.ac.uk/elan/projects/awards2003.html

29 "Structuration theory is based on the premise that the classic actor/structure dualism has to be reconceptualized as a duality -- the duality of structure. The structural properties of social systems exist only in so far as forms of social conduct are reproduced chronically across time and space." That is, social structures are created, persist and develop through the repetition of acts by individual agents. "Social life is more than random individual acts, but is not merely determined by social forces." Behavioural norms are formed by this process but may also be changed http://www.tcw.utwente.nl/theorieenoverzicht/Theory%20Clusters/Organizational%20Communication/Structurational_Theory.doc/index.html and http://www.fact-index.com/t/th/theory_of_structuration.html

30 For example, Edutech (2002) at http://www.edutech.ch/; Eduserve (2002) at http://www.eduserv.org.uk/chest/datasets/vle/; Clements (2003) at http://www.atutor.ca/atutor/files/VLE_comparison.pdf; Fitzgerald (2003) at http://elearn.northampton.ac.uk/blackboard/VLEComparison2003.htm

31 Quantitative data was analysed with assistance from a statistician and using Microsoft Access, Excel and the statistical software SPSS v 11.5 (SPSS Inc., 2001).

32 Verbal data was recorded on analogue tape or digital media then transcribed using a professional transcription service. Textual data was imported into the software N-Vivo version 2.0 (QSR International, 2000) for analysis of themes and development of grounded theory.

33 A search of the Blackboard system on 28th September 2001 yielded 24 individuals. of whom 18 replied to the invitations (sent by email with reminders after 5 days). Attendees

were from the faculties of Medicine (two from Dept of Anatomy), Social Sciences (Dept of Theology & Religious Studies and two from Graduate School of Education), and from the Institute for Learning and Research Technology. There were four observers including the: author (facilitating) plus 2 scribes (each working for half the session time) and 1 flipchart scribe. The focus group was held on Wednesday, 24th October and given the title "Teaching with VLEs".

[34] Data were downloaded as comma separated variable ('.csv') files, one for each course. A single MS Excel spreadsheet was then used to collate and store these statistics and SPSS (version 11) was used to conduct quantitative analysis.

[35] Details of the courses are shown in

Table 17 (appendix), from which the range of topics and numbers of students on courses can clearly be seen.

[36] AC = Academic staff; SS = Support Staff, ST = Staff with Strategic focus; first digit denotes level of involvement in study: 1 = Focus Group only, 2/3/4 = Interviews, 5 = Interviews Focus Group and two interviews.

[37] SS = Support Staff / strategy

[38] The 2001/2 and 2002/3 academic sessions

[39] Announcements (66.5% of all communication use) excluded from this calculation as explained in section 4.4.2, p79.

[40] Similar charts could not be generated for other features since this analysis relies on there being suitable activity descriptors in the Blackboard database from which to distinguish administrative from non-administrative use.

[41] A note about the codes used to represent speakers of original quotes. A three part code is used in which the first number represents the subject (see Table 7 on p71), the second part states whether they are an academic ("Ac"), member of the support services ("SS") or someone involved in strategic decisions ("ST"). Finally the stage of the study from which the quote originates is states as "FG" (Focus Group), "P1" (phase 1 interviews) or "P2" (phase 2 interviews). For example: "(409-AC-P2)".

[42] There are now (from September 2004) administrative tools academics can use to create several groups at once and to enrol batches of students onto these groups.

[43] This feature is now present in the latest version installed at the University (since September 2004).

[44] Programme handbooks, plagiarism statements and generic learning materials were quoted as examples.

[45] Open source refers to any computing code that is in the public domain (not subject to commercial patents and ownership) and can be used and reused by anyone in the community to develop their own applications. Examples include uPortal (used for the university's Portal project) and the Zope content management system (used for various departmental intranets and later endorsed as the supported content management system for the university.

[46] The Blackboard licence was renewed for a further 2 years.

[47] Announcements (66.5% of all communication use) excluded from this calculation as explained in section 4.4.2, p79.

[48] This could only be done manually one student at a time (although there is now a batch file upload tool).

[49] Questionmark Perception™ (http://www.questionmark.com/uk/) and some locally developed tools, and "Test and Learn" (TAL, http://www.tal.bris.ac.uk/).

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50 "...a single point for access to information and services which is: web based; personalised; integrated; and which provides information to all with a legitimate need: staff, students, i.e. all members of the University; alumni, applicants and others beyond the University." (Phillips & Browning, 2002:1).

51 Reinforced by some of the terms used in the software: "courses" not "units"; "Gradebook" and "View Grades".

52 http://www.ltss.bris.ac.uk/

53 Over 1.1GigaBytes in SPSS format.

54 http://www.edutech.ch/

55 Although these courses contain no students they were included as they seemed to demonstrate use of Blackboard by staff for specific purposes.